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Northeast Ohio Regional Sewer District: Economic Impact of Operating and Capital Expenditures, 2012– 2016

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NORTHEAST OHIO REGIONAL SEWER DISTRICT:

ECONOMIC IMPACT OF OPERATING AND CAPITAL EXPENDITURES, 2012 – 2016

September 2010

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EXECUTIVE SUMMARY

This study measures the economic impact of the Northeast Ohio Regional Sewer District's capital and operating expenditures between the years 2012 and 2016 focusing on their impact in the 7-county Northeast Ohio region and in Cuyahoga County. The District is not only responsible for an important part of the infrastructure of Northeast Ohio, but for updating the regional infrastructure, which is critical to economic growth.

Between the years 2012 and 2016, the District will spend an estimated $1.14 billion on their capital program and $621.47 million on their operation (Table A). Of the capital dollars, 82% is estimated to stay in Northeast Ohio ($936.39 million) and 48% in Cuyahoga County ($544.63 million). In terms of operating expenditures, 85% is estimated to remain in Northeast Ohio ($529.83 million) and 71% in Cuyahoga County ($440.34 million).

Table A: Capital & Operating Expenditures, 2012 – 2016

	Capital	Operating
Total Capital Expenditures	$1,139,219,663	$621,468,499
Northeast Ohio 7-County Area	$936,394,788	$529,829,488
Cuyahoga County	$544,634,465	$440,342,747

The economic impact of the District was analyzed using IMPLAN software system. IMPLAN accounts for inter-industry relationships that determine how regional economies respond to changes in economic activities such as investments, spending, and employment. IMPLAN estimates regional multipliers capturing the "ripple effect" throughout the economy. The effect is measured through five impacts: employment, labor income, value added (GDP), output, and tax.

Table B: Economic Impact of Capital & Operating Expenditures, 2012 – 2016

	Employment	Labor Income	Value Added	Output	Tax
	# of jobs	In Millions of Dollars			
Northeast Ohio (7 -County Area)					
Capital: Total	26,591	1,159.9	1,569.0	3,656.7	354.0
Operating: Total	5,034	467.7	628.0	980.9	89.4
Total Impact	**31,625**	**1,627.6**	**2,196.9**	**4,637.6**	**443.5**
Cuyahoga County					
Capital: Total	13,024	615.3	812.7	1,867.5	169.5
Operating: Total	3,581	358.8	486.8	832.5	66.9
Total Impact	**16,605**	**974.1**	**1,299.5**	**2,700.0**	**236.4**

Through the capital and operating expenditures during the 5-year period, more than 31,000 jobs will be created in Northeast Ohio, over 16,000 of which will be created in Cuyahoga County. The District will create additional labor income of $1.6 billion in Northeast Ohio ($974 million in Cuyahoga County alone). Value added of $2.2 billion and output of $4.6 billion will be created ($1.3 billion and $2.7 billion, respectively, in Cuyahoga County alone). Local, state, and federal taxes will increase by $443 million resulting from the District's activities in Northeast Ohio, while taxes in Cuyahoga County will increase by $236 million because of District spending in Cuyahoga County.

INTRODUCTION

This report describes the local economic impact of the Northeast Ohio Regional Sewer District (NEORSD or the District), specifically the impact of its estimated 2012 to 2016 capital and operating expenditures. The major impact is caused by planned capital projects which include dozens of construction projects in wastewater treatment plant improvements and in combined sewer overflow control facilities. The impact on the local economy was evaluated for three specific regions in Northeast Ohio. The first region is the Northeast Ohio 7-County Area which is the largest of the three regions; it includes the Cleveland and Akron metropolitan areas—Cuyahoga, Geauga, Lake, Lorain, Medina, Portage, and Summit counties.[1] The second region includes the four counties—Cuyahoga, Lake, Lorain, and Summit—that comprised the District's Small Business Enterprise (SBE) program at the time of this study. Because the District's SBE area has expanded since the commencement of this study, the results of the analysis for the 4-county area are not detailed in this report but can be found in Appendices A and C. The third region includes only Cuyahoga County, which accounts for the majority of the District's service area (although some parts of Northern Summit County and South Eastern Lorain County are also part of the District's service area).

The study was conducted by the Center for Economic Development at Cleveland State University's Maxine Goodman Levin College of Urban Affairs.

The report includes nine sections. Following this introduction, the next section describes the District including its mission, responsibilities, and activities. The third section discusses the methodology used in this study including the explanation of economic impact, how it is measured, and how the District impact is estimated. The fourth section presents the District's capital and operating expenditures. The fifth through eighth sections present the economic estimates between 2012 and 2016. Two of the sections present the economic impact from capital projects for Northeast Ohio and Cuyahoga County, and two describe the economic impacts from the District's operating expenditures. The final section offers some concluding comments.

[1] This is an economic area that outlines common labor markets; it is a unit of the regional economy where people live and work.

THE NORTHEAST OHIO REGIONAL SEWER DISTRICT: BACKGROUND

The Northeast Ohio Regional Sewer District (District) is an independent political subdivision of the State of Ohio and is organized under the laws of the state, specifically Chapter 6119 of the Ohio Revised Code. Originally named the Cleveland Regional Sewer District, it was created by an Order of the Cuyahoga County Court of Common Pleas in 1972 for the purpose of assuming the operation and management of certain wastewater collection and treatment facilities serving the Cleveland metropolitan area. Prior to 1972, these facilities were owned and operated by the city of Cleveland. In 1979, the name of the District was changed to the Northeast Ohio Regional Sewer District.

The District employs approximately 600 people in a wide range of fields including business administration, biology and chemistry, engineering, wastewater plant operation, accounting, and many others.

The District's existing service area covers approximately 350 square miles. The District encompasses 97% of the city of Cleveland and all of or portions of 60 suburban communities in Cuyahoga and Summit Counties. The area contains a residential service population in excess of one million and includes a diverse group of service, information, biotechnology, manufacturing, and processing industries. The District treats more wastewater than any other wastewater treatment system in the state of Ohio.

The District has made significant contributions to wastewater collection and treatment, storm water management, and water quality issues throughout Greater Cleveland. Since its creation in 1972, the District has planned, designed, constructed, operated, and maintained more than $2 billion of facilities to solve regional problems associated with sanitary and combined sewers. The District owns and operates three major wastewater treatment facilities; approximately 290 miles of large diameter tunnels and interceptors, intercommunity relief sewers, and combined sewer overflow (CSO)-related pipes; and other wastewater facilities including but not limited to seven pump stations to minimize the amount of pollution entering Lake Erie and the Cuyahoga River, the principal waterways in the Cleveland metropolitan area.

In addition, the District protects communities in the service area through detailed monitoring and enforcing of industrial discharge limits, water quality sampling, and combined sewer overflow (CSO) monitoring and notification. The District assures clean water and a healthy environment by developing community partnerships, advocating for clean water on a national level, designing and constructing clean water projects, and providing high-quality service to member communities. The District supports public safety during crises through partnerships and training with emergency support and with standby generators located at five facilities.

Facilities Planning

Over the years, the District has positioned itself to continue to meet the level of service and regulatory requirements demanded by its customers, its Board of Trustees, and regulatory agencies. From 1995 to 2003, the District performed facilities planning studies to develop a plan to further reduce CSO throughout the service area to meet the mandates of the federal CSO policy. The result is a $3 billion CSO program over the next 25 years that will include the design and construction of large storage tunnels and ancillary facilities including green infrastructure.

Capital Improvement Program (CIP)

Over the next 25 years, the present value (2009 dollars) of the District's CIP is estimated at approximately $5 billion. These CIP projects will address both regulatory and renewal/replacement needs of the District's three wastewater plants and the collection system. This includes regulatory driven improvements associated with the District's CSO Long Term Control Plan (LTCP), and the renewal/replacement and upgrade driven improvements identified during plant facilities planning and sewer inspection projects.

Operating Expenses

As with other major utilities, the District is facing rising operating expenses. The District's operating expenses have increased an average of 5% over the last 5 years and are projected to continue to increase over the next 5+ years. The District's actual budget for 2009 was $99.3 million. The adopted 2010 budget totals $107.9 million.

Future Rates

The District's rate structure is established through 2011. The District commenced a rate study in the first quarter of 2010 for purposes of establishing the rate structure for the subsequent 5-year period (2012 – 2016). To support the District's CIP and operating expenses over this 5-year period, the required yearly rate increases are preliminarily estimated to be over 10% per year. To assist in obtaining public awareness and support and Board of Trustees approval of the likely substantial rate increases, a good understanding of the regional economic benefit of the District's CIP and operating expenses is essential.

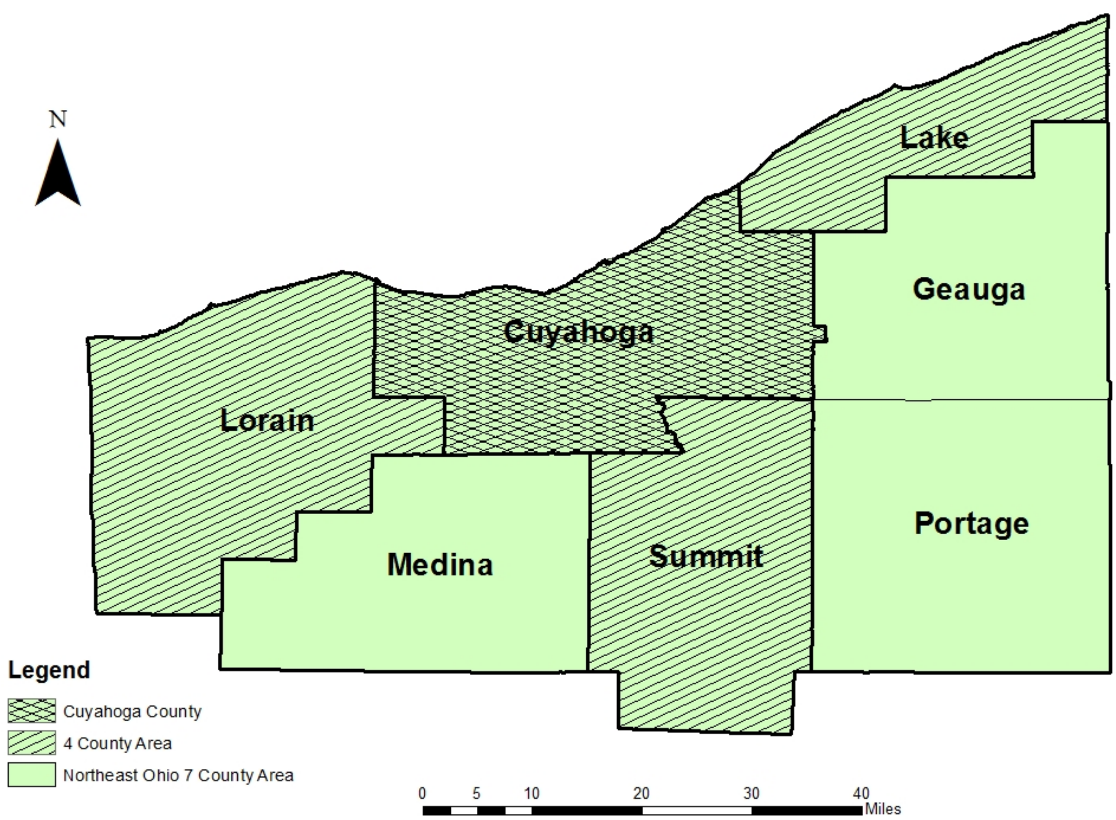
METHODOLOGY

OVERVIEW

This study outlines the economic impact of the District's estimated capital and operating expenditures between the years 2012 and 2016 in three regions of Northeast Ohio. Because the capital and operating expenditures have unique spending patterns, each was handled separately.

The study measured the impacts for a 5-year period, 2012-2016, on three local regions: the Northeast Ohio 7-county area, the 4-county area that represented the District's Small Business Enterprise (SBE) area at the time of this study and Cuyahoga County, which is a part of the first two regions (see Figure 1). In general, the economic impact is larger for a larger region because it may capture a bigger share of the District's payroll and vendors.

Figure 1. Local Regions for which the Economic Impact of the District's 2012-2016 Expenditures was Evaluated



ECONOMIC IMPACT

Economic impact modeling is an analytical approach used to estimate economic benefits from projects, programs, or organizations in affected regions. Economic benefits are determined by spending patterns, investments, and job creation. Economic impact estimates measure the benefits for a specific region and time period.

In general, the main goals in conducting an economic impact study include:

- Increase external awareness
- Strengthen the organization's relationships with various stakeholders
- Assist in marketing and public relations
- Increase internal awareness
- Prepare for a tax levy
- Prepare for a rate increase

Economic impact models are based on input-output (I-O) matrices that estimate inter-industry, buy-sell relationships in a region by measuring the industrial distribution of inputs purchased and outputs sold by each industry. The buy-sell relationships among industries largely determine how an economy responds to changes in economic activity. Economic impact models use the national input-output data (available from the Bureau of Economic Analysis, U.S. Department of Commerce) along with local employment, wage, and other data to estimate a regional input-output model. The model estimates how the impact of one dollar or one job ripples through the local economy, creating additional expenditures and jobs. The multipliers are calculated based on the regional input-output data and they measure the ripple effect that an initial expenditure has on the local economy.

This study uses IMPLAN Professional® and IMPLAN Data Files. IMPLAN Professional® 3.0 is an economic impact assessment software system. The IMPLAN Data Files allow for the creation of sophisticated models of local economies in order to estimate a wide range of economic impacts.

Using IMPLAN, three different models were constructed, one for each region described previously. Each region was built using SAM (Social Accounting Matrix) multipliers (Type SAM multipliers are the direct, indirect, plus induced effects) which allow for inter-institutional[2] transfers in addition to inter-industry flows. The impact for each region was then estimated.

The economic impact is measured in terms of five variables: employment, labor income, value added, output, and taxes.

- Employment impact measures the number of additional jobs created in the region as a result of the District's capital and operating expenditures.
- Labor-income impact measures the additional household earnings created in the region due to the District's capital and operating expenditures.

[2] Inter-institutional transfers include payments of taxes by individuals and businesses, transfer of government funds to people and businesses, and transfer of funds from people to people.

- Value-added impact measures the additional value-added output created in the region as a result of the District's capital and operating expenditures. Value added is output less the value of intermediary goods[3].
- Output impact measures the additional value of goods and services produced in the region as a result of the District's capital and operating expenditures.
- Tax impact measures the additional federal, state, and local tax revenues collected in the region as a result of the District's capital and operating expenditures.

The employment, labor-income, value-added, and output impacts are each a summation of three impacts: direct impact, indirect impact, and induced impact. *Direct impact* refers to the initial value of goods and services, including labor, purchased by the District within each of the three regions. These purchases are sometimes referred to as the first-round effect. *Indirect impact* measures the value of labor, capital, and other inputs of production needed to produce the goods and services required by the District (second-round and additional round effects). *Induced impact* measures the change in spending by local households because of increased earnings by employees in local industries who produce goods and services for the District and its suppliers. When examining the operating expenditures of the District, a fourth impact is added termed the "change in final demand." The change in final demand is represented by the employment, salaries, and expenditures of the District.

Data Preparation

Capital Expenditures

The District's capital program between 2012 and 2016 includes 57 wastewater treatment plant projects and 37 CSO and interceptor projects. Over the entire life of these projects, they represent $327.96 million worth of investment in plants and $805.67 million invested in the CSO/interceptor projects for a total of $1.13 billion. These numbers represent the total cost of the projects before they are separated by year and by the percentage of the materials and labor that are purchased in the regions of study.

For most projects, detailed planning level, design level, or bid level estimates of the engineering and construction costs were provided by the District. A list of budget line items was created and IMPLAN codes were assigned to each project that exists in the study time frame (2012-2016). As the costs budgeted for some of the projects have changed since the planning level estimates, adjustments to the estimates were made as necessary and the budget categories were then adjusted by line item to reflect the new total.

Next, using detailed cost data provided by the District, the percentage of each project to be completed in each year of the study (2012-2016) was calculated. As identified by the District, some line items, such as "construction contingencies" that are included in planning and design estimates,

[3] Intermediary goods and services—such as energy, materials, and purchased services—are purchased for the production of other goods and services rather than for final consumption.

were distributed into the line items of the entire estimate.

Based on information provided by the District, ratios for each line item were applied to determine the amount spent on labor versus the amount spent on materials. Also, ratios estimated by the District based on historical spending practices were applied to the amount of spending that will occur within each of the three regions. Spending outside each of the studied regions was excluded from the impact analysis.

At this point, the data on materials and labor were aggregated into IMPLAN industry codes. All of these data were then broken out by year.

An additional group of construction projects was added to CIP data as "capital projects." The impact of capital projects was calculated for the years 2012 through 2014. These projects are for infrastructure improvements and are supervised by departments other than engineering. The data for these projects from the District were organized by line item, and spending was broken out by region and by the amount to be spent on materials versus labor. Data were organized first by the amount to be spent on materials versus labor and were then split further to reflect the spending by region. Next, the data were broken down by year, aggregated by IMPLAN code for input into the model, and added to the 2012 to 2016 capital program expenditures.

Operating Expenditures

This study also estimates the economic impact based on the projected operating expenditures of the District. This spending reflects the day-to-day operations of the District as projected for the 5 years, 2012-2016, as well as non-"capitalizable" expenditures.

These data were divided into two parts—salaries and other spending. For salaries, the District provided yearly data for each job category including total wages by salary range and the percentage of employees who reside within each region. The longevity and sick buy-out line items were aggregated into the salaries by distributing their costs according to the relative salary size. Overtime spending was also aggregated up into the appropriate salary line item. Salaries based on the percentage of employees that reside in each region were calculated and then the data were organized by IMPLAN household-income range for input into the IMPLAN model.

The non-salary operating spending was also organized by region and by year. The data were first split by the spending in each region. The data were then aggregated into IMPLAN industry codes. All of these data were broken down by year.

DISTRICT EXPENDITURES: 2012-2016

The impact is based on the District's capital and operating expenditures in each region. Only expenditures from regional vendors and expenses on labor that reside within the region are included in the impact analysis. Overall, 83% of the District's expenditures between 2012 and 2016 are estimated to remain in Northeast Ohio and 56% in Cuyahoga County.

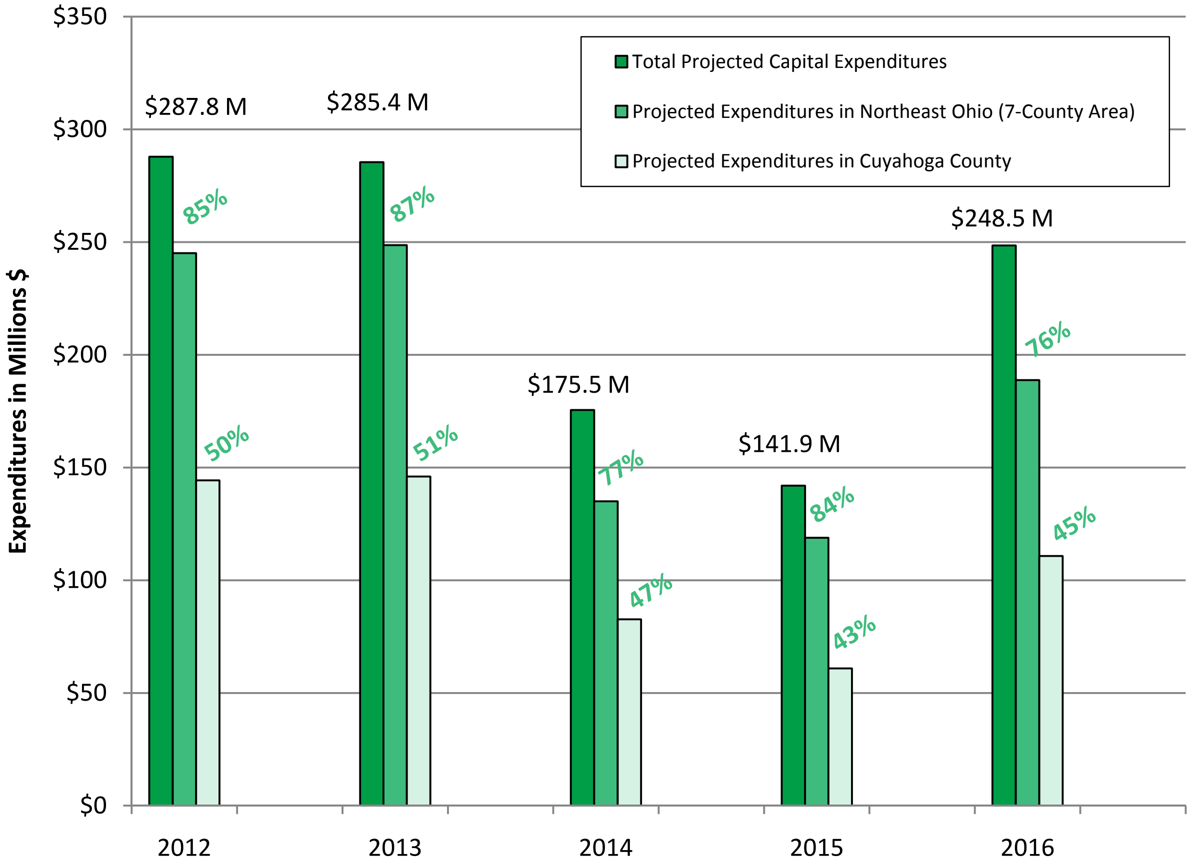
CAPITAL EXPENDITURES

Table 1 provides a summary of the estimated capital expenditures by material and labor within the Northeast Ohio region and Cuyahoga County for each of the years from 2012 to 2016. It is estimated that of the District's total capital expenditures between 2012 and 2016, 82% will be within Northeast Ohio and 48% within Cuyahoga County. Figure 2 shows the projected capital expenditures of the District between 2012 and 2016. Between 76% and 87% of the expenditures will be spent in Northeast Ohio and between 43% and 51% will be spent in Cuyahoga County.

Table 1: Capital Materials & Labor, 2012 – 2016

	2012	2013	2014	2015	2016	2012-2016
Total Capital Expenditures	$287,841,537	$285,422,006	$175,521,763	$141,948,371	$248,485,986	$1,139,219,663
Northeast Ohio 7-County Area	$245,128,129	$248,665,322	$135,035,325	$118,807,535	$188,758,477	$936,394,788
Cuyahoga County	$144,286,499	$146,030,106	$82,644,703	$60,912,188	$110,760,969	$544,634,465

Figure 2. District Projected Capital Expenditures, 2012-2016



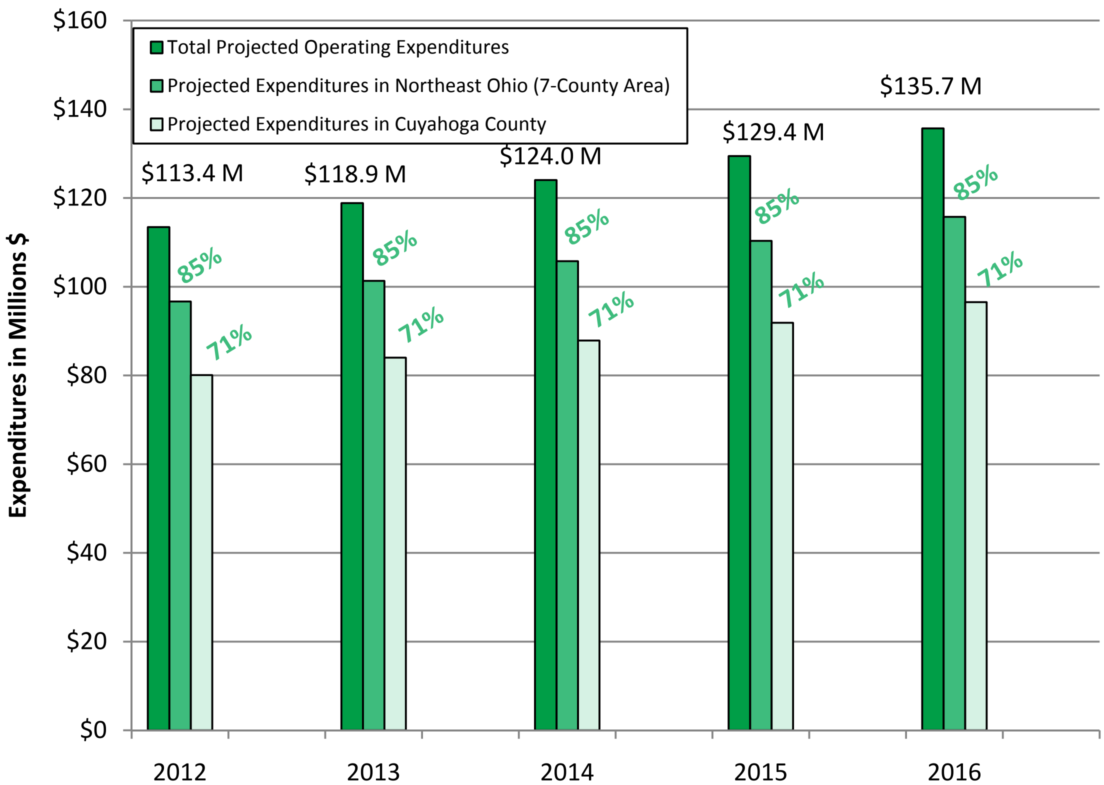
Operating Expenditures

Table 2 provides a summary of the estimated operating expenditures by material and labor within Northeast Ohio and Cuyahoga County for each of the years from 2012 to 2016. Similar to the capital expenditures, only operating expenditures from regional vendors and expenses for employees that reside within the identified region are included in determining the economic impact on that region. It is estimated that of the District's 2012 to 2016 total operating expenditures, 85% will be within Northeast Ohio and 71% within Cuyahoga County. Figure 3 shows the projected operating expenditures of the District between 2012 and 2016.

Table 2: Operating Materials & Labor, 2012 – 2016

	2012	2013	2014	2015	2016	2012-2016
Total Operating Expenditures	$113,447,341	$118,857,944	$124,045,441	$129,441,626	$135,676,147	$621,468,499
Northeast Ohio 7-County Area	$96,677,868	$101,313,327	$105,749,661	$110,352,476	$115,736,156	$529,829,488
Cuyahoga County	$80,057,911	$84,020,305	$87,859,289	$91,871,800	$96,533,443	$440,342,747

Figure 3. District Projected Operating Expenditures, 2012-2016



CAPITAL EXPENDITURES: ECONOMIC IMPACTS IN NORTHEAST OHIO 7-COUNTY AREA, 2012-2016

This section describes the economic impacts that occur in Northeast Ohio as a result of the District's estimated capital expenditures during a 5-year period between 2012 and 2016.[4]

CAPITAL EXPENDITURES

The impact estimates are based on the direct expenditures of capital projects that will be made by the District within Northeast Ohio. Table 3 shows the estimated expenditures in each of the years broken out by materials and labor. Moreover, materials are divided into 32 different industries. These data were calculated from detailed cost estimates provided by the District, based on planning level, design level, or bid level estimates. Total estimated expenditures for the 5 years amount to $936.4 million. Cost estimates differ by year from the highest cost estimate of $248.7 million in 2013 to the lowest of $118.8 million in 2015. The projects are projected to begin in different years and many take more than 1 year to complete. On average over the 5-year period, materials accounted for 44.5% of total expenditures, from 40.1% in 2013 to 51.1% in 2015. Over the 5 years combined, the highest expenditures on materials occur in *Construction of Other New Nonresidential Structures* ($132 million), *Maintenance and Repair Construction of Nonresidential Structures* ($63.6 million), and *Material Handling Equipment Manufacturing* ($55.9 million). Other industries that would benefit most in some of the years include *Fabricated Pipe and Pipe Fitting Manufacturing* ($41.9), *Ready-Mix Concrete Manufacturing* ($38.1 million), and *Construction Machinery Manufacturing* ($34.3).

Labor costs accounted for an average of 55.5% of total cost, from a high of 59.9% in 2013 to a low of 48.9% in 2015.

[4] This section includes both construction and non-construction capital projects. The report includes information on construction projects between 2012 and 2016 and non-construction projects between 2012 through 2014.

Table 3. Northeast Ohio – Capital Expenditures (in dollars), 2012-2016

Industry Description	2012	2013	2014	2015	2016
Materials Total	**107,313,278**	**99,748,021**	**57,193,832**	**60,682,068**	**91,554,029**
Electric power generation, transmission, and distribution	10,389	7,916	1,004	0	0
Construction of other new nonresidential structures	52,954,200	38,839,364	6,166,819	8,236,330	25,801,160
Maintenance & repair construction of nonresidential structures	10,549,595	11,681,989	15,821,405	18,500,670	7,020,138
Asphalt paving mixture and block mfg	170,916	130,222	16,523	569	0
Asphalt shingle and coating materials mfg	505,900	274,776	167,536	380,030	573,339
Other plastics product mfg	1,015,731	417,078	179,978	166,747	5,620,569
Ready-mix concrete mfg	6,994,480	13,775,847	5,414,119	1,482,850	10,446,527
Concrete pipe, brick, and block mfg	789,460	642,545	217,981	60,212	472,955
Lime and gypsum product mfg	366,498	80,101	41,336	36,297	70,507
Steel product mfg from purchased steel	2,121,895	2,040,850	4,931,624	1,387,541	1,470,096
Aluminum product mfg from purchased aluminum	0	0	0	30,111	12,713
Ornamental and architectural metal products mfg	376,356	154,063	99,440	63,060	147,310
Fabricated pipe and pipe fitting mfg	4,536,093	3,722,323	7,078,713	21,260,740	5,311,153
Construction machinery mfg	8,747,107	15,428,561	3,877,828	2,004,269	4,207,156
Air purification and ventilation equipment mfg	58,200	0	0	0	0
Air conditioning, refrigeration, & warm air heating equipment mfg	0	20,250	0	48,613	20,525
Pump and pumping equipment mfg	35,000	0	0	1,100,329	3,047,024
Material handling equipment mfg	12,081,953	8,809,690	10,515,813	4,313,799	20,213,772
Computer terminals & other computer peripheral equipment mfg	27,900	27,900	0	0	0
Industrial process variable instruments mfg	352,795	267,623	59,019	182,014	827,869
Totalizing fluid meters and counting devices mfg	100,000	0	0	0	0
Analytical laboratory instrument mfg	16,880	272,500	11,880	0	0
Power, distribution, and specialty transformer mfg	25,000	0	0	0	0
Switchgear and switchboard apparatus mfg	3,038,600	1,581,483	465,886	303,865	1,978,805
Relay and industrial control mfg	43,200	43,200	0	0	0
Communication and energy wire and cable mfg	3,600	3,600	0	0	0
Custom architectural woodwork and millwork mfg	113,258	63,462	48,767	61,343	387,145
Showcase, partition, shelving, and locker mfg	287,075	142,669	107,418	117,242	246,052
Retail Stores - Motor vehicle and parts	828,000	162,000	281,000	0	0
Software publishers	21,600	0	0	0	0
Securities, commodity contracts, investments & related activities	389,562	407,031	746,318	520,563	2,201,626
Insurance carriers	716,479	723,890	939,987	421,822	1,459,144
Waste management and remediation services	35,556	27,090	3,437	3,051	18,444
Labor Total	**137,814,851**	**148,917,301**	**77,841,493**	**58,126,036**	**97,203,879**
Total Expenditure	**245,128,129**	**248,665,322**	**135,035,324**	**118,808,104**	**188,757,908**

Capital Projects: Total Economic Impact

Total economic impact is estimated by using five measures: employment, labor income, value added, output, and taxes. Each of the first four measures is an aggregation of direct, indirect, and induced impacts. Tax impact includes state and local taxes as well as federal taxes. Impact results are estimated in 2010 dollars.

The economic impact results are summarized in Table 4. Nearly 26,600 jobs will be created in Northeast Ohio as a result of capital expenditures by the District between 2012 and 2016. Labor Income (or household earnings) will increase by $1.16 billion as a result of the District's capital expenditures. Excluding intermediary goods and measuring only the value added of production shows that the value-added impact amounts to $1.57 billion. Measured in terms of output, the analysis shows that total value of all goods and services (output impact) produced in the region as a result of the District's capital expenditures will increase by $3.66 billion. Analysis of these impacts by direct, indirect, and induced impacts will be presented in later sections, which discuss in more detail each of the impact measures.

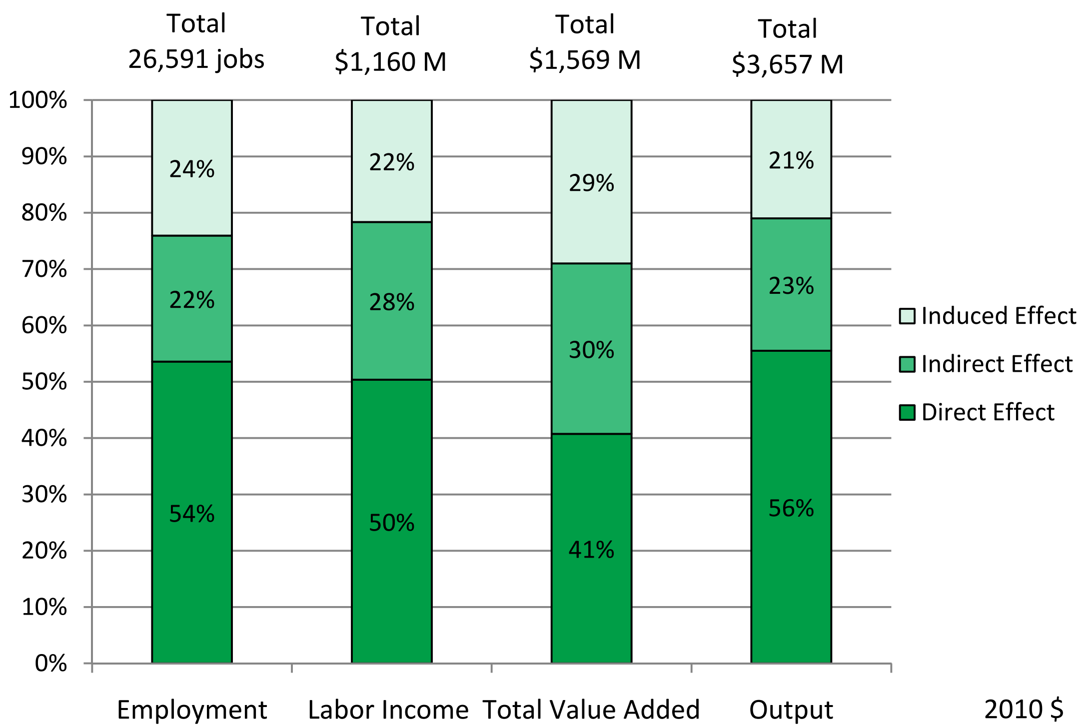
Capital expenditures also create tax impact. Total tax revenues will increase by $354 million during the years 2012 to 2016. Of the total taxes, $135.8 million are state and local taxes and $218.3 million are federal taxes.

Table 4. Northeast Ohio – Economic Impact of Capital Expenditures, 2012-2016 (Impact in 2010 dollars)

Impact Type	Employment	Labor Income ($M)	Total Value Added ($M)	Output ($M)
Direct Impact	14,242	584.21	639.38	2,029.47
Indirect Impact	5,954	324.50	474.45	859.20
Induced Impact	6,395	251.24	455.12	768.03
Total Impact	26,591	1,159.95	1,568.96	3,656.70

The economic impact is also summarized in Figure 4, which highlights the percentage of direct, indirect, and induced impacts in each of the impact measures. The direct employment impact contributes over 14,200 jobs, accounting for 53.6% of total employment impact. It measures the estimated number of employees hired to work on the new capital expenditures. Close to 6,000 additional employees will work for the companies who sell goods and services to the vendors directly involved with the projects over 5 years. This indirect employment effect accounts for 22.3% of total employment impact. Additional 6,400 employees work in industries that experience increased demand from households that are involved in the projects either directly or indirectly. These are industries that correspond to households' spending patterns.

Figure 4. Northeast Ohio – Impacts of Capital Projects: Direct, Indirect, and Induced impacts as Percentage of Total Impact



Of the additional labor income impact of $1.16 billion, direct impact accounts for 50.4%, while indirect and induced impacts account for 28.0% and 21.7%, respectively. Analyzing across the impact measures shows that direct impacts have the largest share of total impacts. Direct impacts range from 41% of value-added impact to 56% of output impact. The indirect impacts range from 22% of total employment impact to 30% of total value-added impact. The induced effects contributed from 21% in output impact to 29% in value-added impact.

The following sections will describe in more detail the economic impact from capital expenditures for each of the five measures: employment, labor income, value added, output, and taxes.

EMPLOYMENT IMPACT

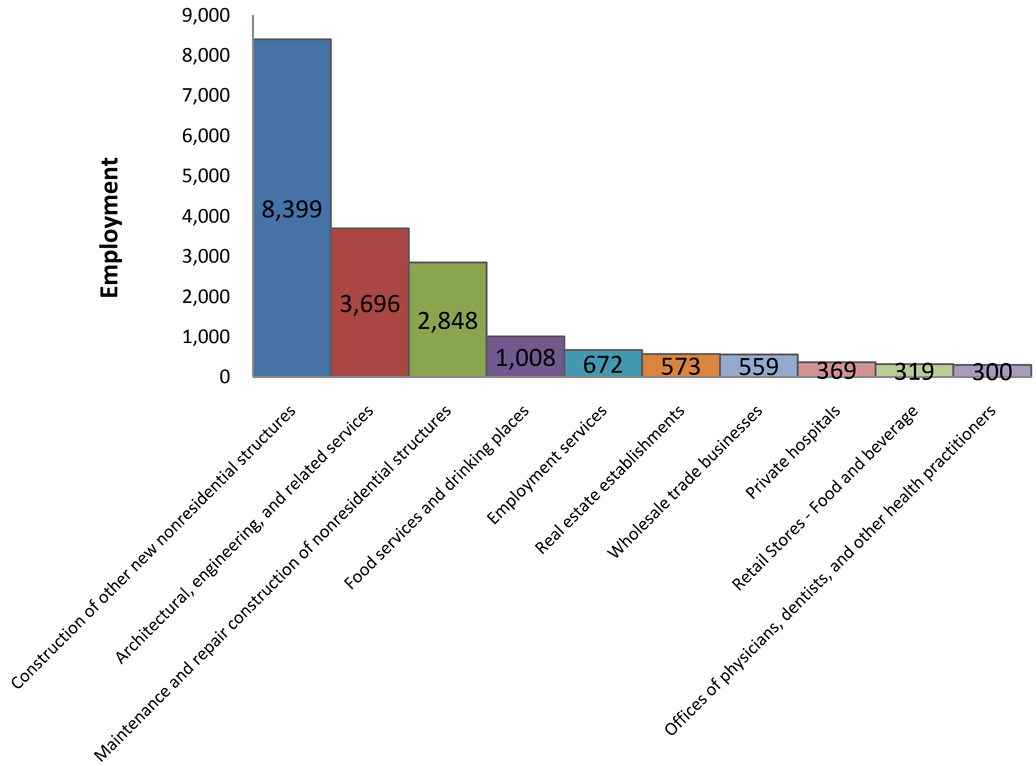
Employment impact measures the number of jobs that will be created in a given region during an identified time frame for identified expenditures. Employment impact shows that almost 26,000 jobs will be created in Northeast Ohio, over the 5-year period, as a result of the District's capital expenditures between 2012 and 2016.

Another way to examine the economic impact is to identify the top 10 industries that were the most affected by capital expenditures. Figure 5 highlights the top 10 industries with the highest total employment impact during the 5-year period studied. The 10 industries that will create the most jobs account for 70% of all jobs created as a result of capital expenditures.

Three industries account for the majority of these jobs: *Construction of Other New Nonresidential Structures* (8,400 jobs)*;* *Architectural, Engineering, and related services* (3,700 jobs)*;* and *Maintenance and Repair Construction of Nonresidential Structures* (2,850 jobs). These industries have large direct employment impact, which is consistent with capital projects.

The other leading industries in employment impact registered high employment impact because of indirect and induced impacts. The industry with the highest indirect employment impact is *Architectural and Engineering*, while the highest induced employment impact occurs in *Food Services and Drinking Places* followed by *Hospitals*, industries where households spend their earnings.

Figure 5. Northeast Ohio – Top 10 Industries with the Highest Total Employment Impact from Capital Expenditures



Industry Description	Direct	Indirect	Induced	Total
Construction of other new nonresidential structures	8,399	0	0	8,399
Architectural, engineering, and related services	2,515	1,161	21	3,696
Maintenance and repair construction of nonresidential structures	2,786	43	19	2,848
Food services and drinking places	0	318	690	1,008
Employment services	0	529	143	672
Real estate establishments	0	220	353	573
Wholesale trade businesses	0	347	212	559
Private hospitals	0	0	369	369
Retail stores - Food and beverage	0	83	236	319
Offices of physicians, dentists, and other health practitioners	0	0	300	300
Total Top 10	13,699	2,701	2,344	18,744
Total Industry	14,242	5,954	6,395	26,591
Percentage of 10 Industries	96.19%	45.36%	36.65%	70.49%

Detailed industries can be aggregated to major sectors to analyze the impact throughout the economy. Table 5 shows how the employment impact is distributed among the major sectors of the regional economy. Nearly 11,300 jobs will be created in the *Construction* sector through direct impact and about 4,650 jobs will be in *Professional, Scientific, and Technical Services* primarily through direct and indirect impacts. It should be noted that only three sectors benefit from direct employment impact—*Construction; Professional, Scientific, and Technical Services; and Manufacturing*. Most other major sectors benefit from indirect and induced effect. The largest sectors that benefit from induced impact, which results from dollars re-circulating through household spending patterns causing local economic activity, are *Retail Trade* and *Health and Social Services*.

Table 5. Northeast Ohio – Employment Impact from Capital Expenditures by Major Economic Sector

Industry Description	Direct	Indirect	Induced	Total
Agriculture, forestry, fish & hunting	0	12	11	23
Mining	0	39	3	43
Utilities	0	18	21	38
Construction	11,185	45	48	11,278
Manufacturing	487	337	65	889
Wholesale trade	0	347	212	559
Retail trade	3	538	1,295	1,836
Transportation & warehousing	0	282	129	411
Information	1	117	96	213
Finance & insurance	34	259	431	725
Real estate & rental	0	320	383	702
Professional- scientific & tech services	2,519	1,847	285	4,651
Management of companies	0	103	34	137
Administrative & waste services	14	934	318	1,266
Educational services	0	5	260	265
Health & social services	0	0	1,325	1,325
Arts- entertainment & recreation	0	39	159	198
Accommodation & food services	0	320	693	1,013
Other services	0	336	560	896
Government & non NAICs	0	55	66	122
Total	**14,242**	**5,954**	**6,395**	**26,591**

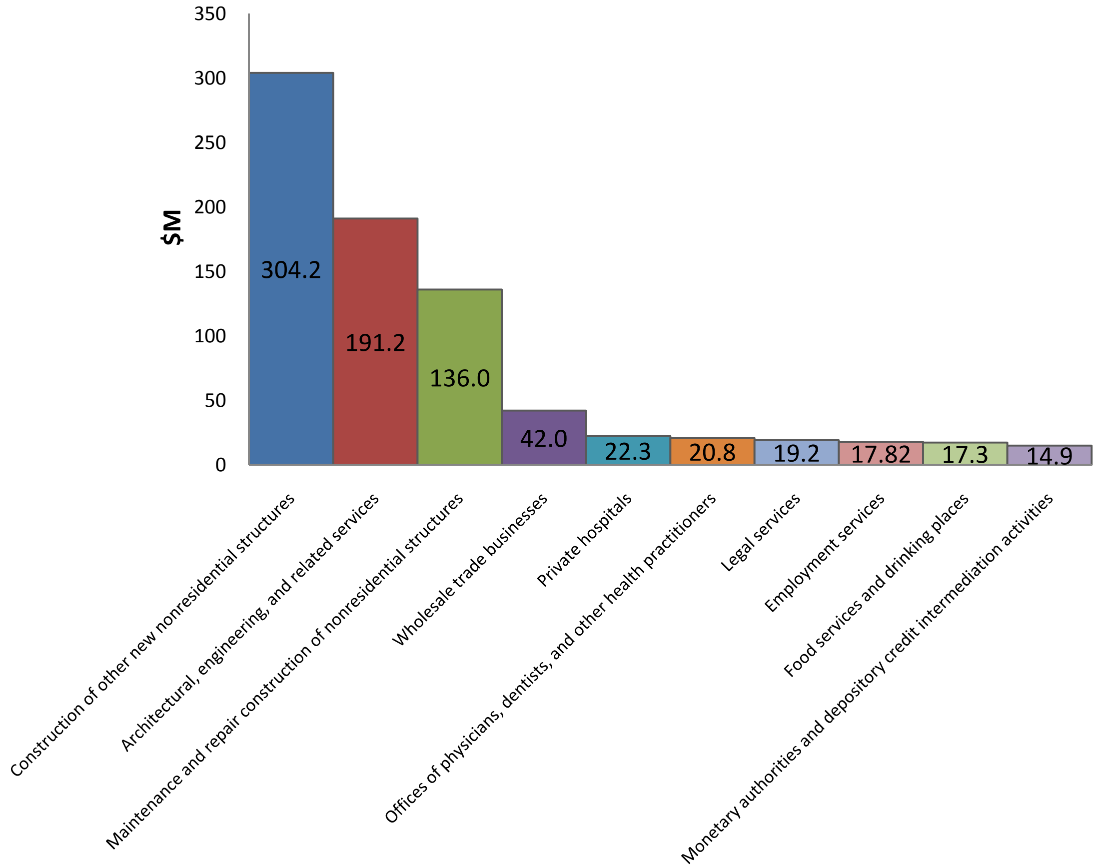
LABOR INCOME IMPACT

Labor-income impact is the measurement of the additional income earned by households in a given region during an identified time frame for identified expenditures. The District's capital expenditures between 2012 and 2016 will create additional labor income (household earnings) of $1.16 billion. In other words, employees working on the capital projects or for the suppliers of goods and services to the companies directly involved in the capital projects or in companies experiencing additional demand through household spending, will have an additional income of $1.16 billion over the 5-year period.

Analyzing labor-income impact by detailed industries indicates that the top 10 industries account for 67% of all labor income impact (Figure 4). As with employment impact, the most impact is created in three industries: *Construction of Other New Nonresidential Structures* ($304.2 million); *Architectural and Engineering* ($191.2 million)*; and Maintenance and Repair Construction of Nonresidential Structures* ($136.0 million).

The impact of the top three industries results mainly through direct impact. Industries benefiting from induced impact that are created through household spending include *Hospitals; Offices of Physicians, Dentists, and Other Health Professionals; Wholesale Trade; and Food Services and Drinking Places*.

Figure 6. Northeast Ohio – Top 10 Industries with the Highest Total Labor Income Impact from Capital Expenditures (in Millions of 2010 Dollars)



Industry Description	Direct	Indirect	Induced	Total
Construction of other new nonresidential structures	304.24	0	0	304.24
Architectural, engineering, and related services	109.56	80.16	1.46	191.18
Maintenance and repair construction of nonresidential structures	132.50	2.42	1.07	135.99
Wholesale trade businesses	0	26.07	15.96	42.03
Private hospitals	0	0	22.30	22.30
Offices of physicians, dentists, and other health practitioners	0	0	20.83	20.83
Legal services	0	12.52	6.65	19.17
Employment services	0	14.02	3.79	17.82
Food services and drinking places	0	5.45	11.82	17.27
Monetary authorities & depository credit intermediation activities	0	7.95	6.92	14.86
Total Top 10	546.30	148.59	90.80	785.69
Total Industry	584.21	324.50	251.24	1,159.95
Percentage of 10 Industries	**93.51%**	**45.79%**	**36.14%**	**67.73%**

In order to examine the impact throughout the whole economy, labor-income impact is analyzed based on the economy's major sectors. The additional income is spread around many sectors of the economy, but as with employment impact, the two sectors whose employees benefit the most from additional household income are *Construction* and *Professional Scientific, and Technical Services*.

Table 6 shows that employees in the construction industry will earn an additional $441.4 million, while employees of the *Professional, Scientific, and Technical Services* sector will earn an additional $256.9 million. Seven sectors benefit from direct labor income, while all sectors benefit from indirect and induced impacts.

Employees in the *Professional, Scientific, and Technical Services* sector experienced the most indirect impact ($128.5 million), while the induced income impact is highest in the *Health and Social Services* sector ($62.4 million) and *Retail Trade* ($36 million).

Table 6. Northeast Ohio – Labor Income Impact from Capital Expenditures by Major Economic Sector (in Millions of 2010 Dollars)

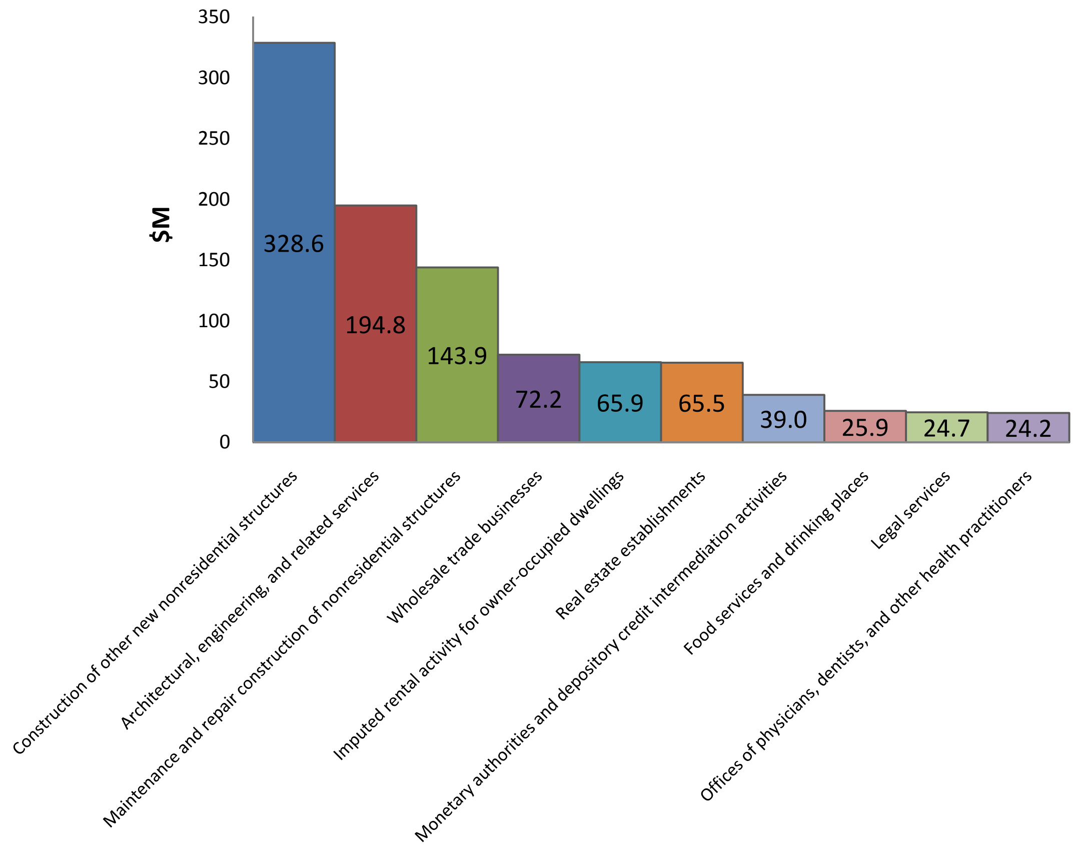
Description	Direct	Indirect	Induced	Total
Agriculture, forestry, fish & hunting	0	0.29	0.18	0.48
Mining	0	3.11	0.30	3.41
Utilities	0	2.23	2.61	4.85
Construction	436.74	2.47	2.22	441.43
Manufacturing	34.43	27.79	4.26	66.48
Wholesale trade	0	26.07	15.96	42.03
Retail trade	0.13	15.29	36.02	51.44
Transportation & warehousing	0	14.52	6.54	21.06
Information	0.05	7.66	5.71	13.43
Finance & insurance	2.39	18.60	30.08	51.07
Real estate & rental	0	12.18	9.80	21.97
Professional- scientific & tech svcs	109.78	128.47	18.64	256.88
Management of companies	0	10.56	3.54	14.10
Administrative & waste services	0.68	30.04	10.22	40.94
Educational services	0	0.15	7.00	7.15
Health & social services	0	0.004	62.42	62.42
Arts- entertainment & recreation	0	1.07	4.12	5.19
Accommodation & food services	0	5.51	11.90	17.41
Other services	0	14.23	14.55	28.78
Government & non NAICs	0	4.27	5.18	9.44
Total	**584.21**	**324.50**	**251.24**	**1,159.95**

VALUE-ADDED IMPACT

The value-added impact measure corresponds to the measure of Gross Domestic Product. Value-added impact measures the value of all goods and services produced in the region less the intermediary goods purchased in order to produce these goods and services. Intermediary goods and services—such as energy, materials, and purchased services—are purchased for the production of other goods and services rather than for final consumption. It is parallel to Gross Domestic Product (GDP) which measures the value-added output produced in the United States.

As a result of capital expenditures by the District between 2012 and 2016, value added of $1.57 billion will be created in Northeast Ohio. The top 10 industries producing this value added account for 63% of total value-added impact. The 10 highest industries are presented in Figure 5. As expected, the top three industries in employment and labor-income impacts are also the top three industries in value-added impact. These industries are also the only ones that had a large direct impact. The value-added impact in the other leading industries resulted because of the indirect and induced impacts. The highest indirect effect occurred in *Architectural and Engineering* and in *Wholesale Trade*. This is attributed to second-round, third-round, and additional round suppliers that sell goods and services to those directly engaged in the construction projects. The highest induced effects occurred in *Owner Occupied Dwellings* (through imputed rental activity), *Real Estate*, and *Wholesale Trade*. These industries have shown impact because of increased spending by households who benefit from additional income earned due to the capital expenditures.

Figure 7. Northeast Ohio – Top 10 Industries with the Highest Total Value-Added Impact from Capital Expenditures (in Millions of 2010 Dollars)



Industry Description	Direct	Indirect	Induced	Total
Construction of other new nonresidential structures	328.6	0	0	328.6
Architectural, engineering, and related services	112.0	81.3	1.5	194.8
Maintenance and repair construction of nonresidential structures	140.2	2.5	1.1	143.9
Wholesale trade businesses	0	44.8	27.4	72.2
Imputed rental activity for owner-occupied dwellings	0	0	65.9	65.9
Real estate establishments	0	25.1	40.4	65.5
Monetary authorities & depository credit intermediation activities	0	20.9	18.2	39.0
Food services and drinking places	0	8.2	17.7	25.9
Legal services	0	16.2	8.6	24.7
Offices of physicians, dentists, and other health practitioners	0	0	24.2	24.2
Total Top 10	580.9	198.9	204.8	984.6
Total Industry	639.4	474.5	455.1	1,569.0
Percentage of 10 Industries	**90.85%**	**41.93%**	**45.01%**	**62.76%**

The hundreds of detailed industries can be aggregated to 20 major sectors to show how the impact occurs throughout the economy. Table 7 shows the distribution of value-added impact by these sectors. As expected, the largest impact will occur in the *Construction* sector, primarily due to a large direct impact. The second largest impact will occur in the *Professional, Scientific, and Technical Services* sector and is due to direct, indirect, and induced impacts. This sector benefits from direct services provided to the capital projects as well as from services supplied to the vendors directly engaged in the capital projects. In addition, the induced impact occurs when households purchase professional help such as legal and accounting services. The third highest sector most impacted by the capital expenditures is *Real Estate & Rental* and its impact comes only through the indirect and induced effects, with most of it coming through household spending.

Table 7. Northeast Ohio – Value Added Impact from Capital Expenditures by Major Economic Sector (in Millions of 2010 Dollars)

Industry Description	Direct	Indirect	Induced	Total
Agriculture, forestry, fish & hunting	0	0.52	0.37	0.89
Mining	0	6.07	0.77	6.84
Utilities	0.01	7.36	8.70	16.07
Construction	468.84	2.61	2.85	474.30
Manufacturing	53.60	42.88	6.73	103.21
Wholesale trade	0	44.77	27.41	72.18
Retail trade	0.17	24.96	59.04	84.16
Transportation & warehousing	0	20.43	9.12	29.55
Information	0.11	17.28	12.34	29.73
Finance & insurance	3.20	35.87	50.87	89.94
Real estate & rental	0	39.31	108.70	148.02
Professional- scientific & tech svcs	112.30	144.23	22.85	279.39
Management of companies	0	14.18	4.75	18.93
Administrative & waste services	1.15	37.53	12.99	51.66
Educational services	0	0.17	7.66	7.82
Health & social services	0	0.01	72.71	72.71
Arts- entertainment & recreation	0	1.33	5.87	7.20
Accommodation & food services	0	8.27	17.85	26.11
Other services	0	22.36	17.82	40.18
Government & non NAICs	0	4.31	5.73	10.04
Total	**639.38**	**474.45**	**455.12**	**1568.96**

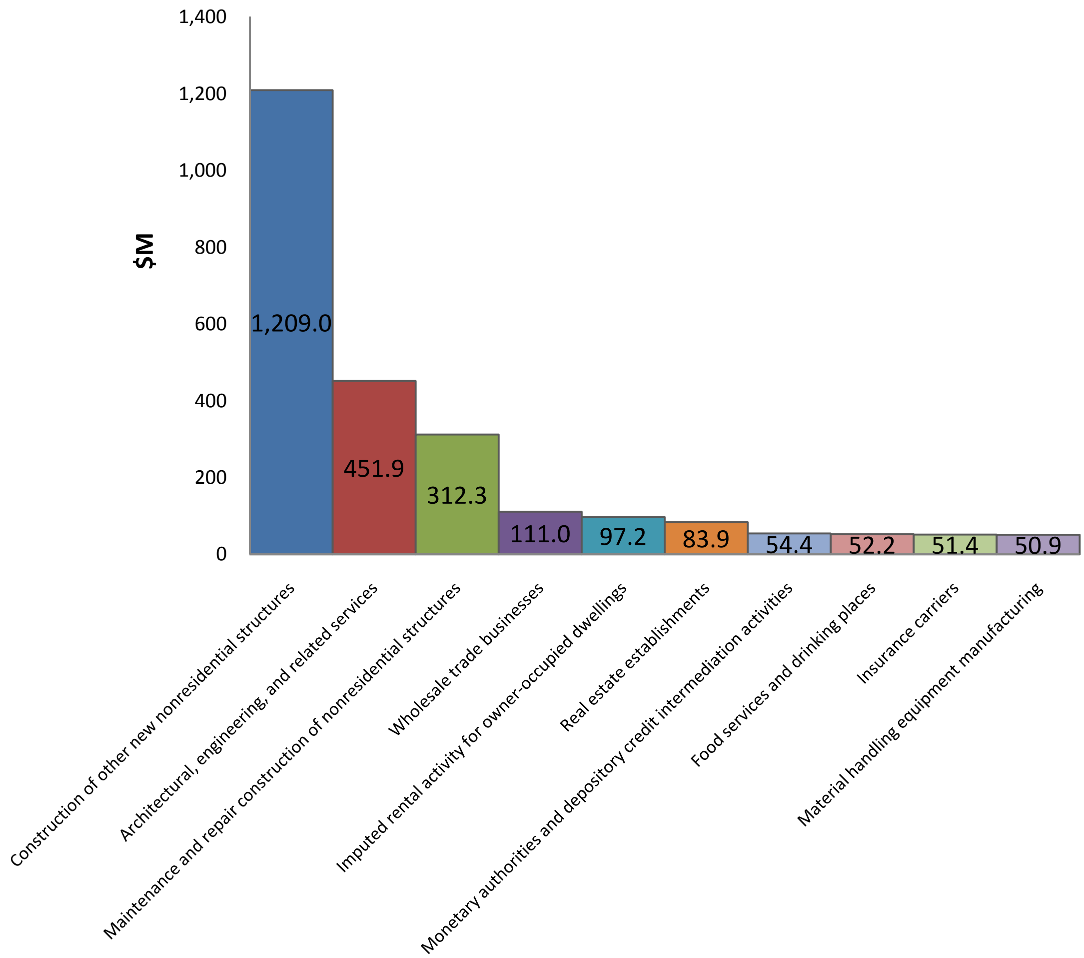
Output Impact

Output impact measures the value of all goods and services produced in the economy or, in other words, output represents the value of industry production. It is always higher than value added because it includes intermediary goods.

Capital expenditures by the District between 2012 and 2016 will create an output impact of $3.66 billion in Northeast Ohio (measured in 2010 dollars). The top 10 industries that will benefit from this impact are presented in Figure 6. They account for 68% of all output impact. Again, the top three industries are the same. The output impact on the *Construction of Other New Nonresidential Structures* is all due to the direct impact. The output impact on *Architectural and Engineering* is due primarily to direct and indirect impacts, resulting from spending on the construction projects and the different tiers of suppliers. The third highest impacted industry is *Maintenance and Repair Construction of Nonresidential Structures* with most of the impact coming from the direct impact. The only other industry of the top 10 that had considerable direct impact is *Materials Handling Manufacturing Equipment*.

The output impact in the other top 10 industries resulted because of the indirect and induced impacts. The highest indirect effect occurred in *Architectural and Engineering* and in *Wholesale Trade* (as in value-added impact). This is attributed to second-round, third-round, and additional round suppliers that sell goods and services to those directly engaged in the construction projects. Again, as was found in value-added impact, the highest induced effects occurred in *Owner Occupied Dwellings* (through imputed rental activity), and in *Real Estate*. These industries have impact because of increased spending by households who will benefit from additional income earned from CIP projects.

Figure 8. Northeast Ohio – Top 10 Industries with the Highest Total Output Impact from Capital Expenditures (in Millions of 2010 Dollars)



Industry Description	Direct	Indirect	Induced	Total
Construction of other new nonresidential structures	1,209.0	0	0	1,209.0
Architectural, engineering, and related services	307.5	141.9	2.6	451.9
Maintenance & repair construction of nonresidential structures	305.4	4.8	2.1	312.3
Wholesale trade businesses	0	68.9	42.2	111.0
Imputed rental activity for owner-occupied dwellings	0	0	97.2	97.2
Real estate establishments	0	32.2	51.7	83.9
Monetary authorities & depository credit intermediation activities	0	29.1	25.3	54.4
Food services and drinking places	0	16.5	35.7	52.2
Insurance carriers	3.7	13.5	34.2	51.4
Material handling equipment manufacturing	50.4	1	0	50.9
Total Top 10	1,876.0	307.3	291.0	2,474.4
Total Industry	2,029.5	859.2	768.0	3,656.7
Percentage of 10 Industries	**92%**	**36%**	**38%**	**68%**

All of the detailed industries can be aggregated into 20 major sectors to show how the impacts are distributed across the whole economy. Table 8 shows the distribution of output impact by these sectors. As expected, the largest impact will occur in the *Construction* sector ($1.5 billion), with most of it resulting from the direct impact. The second largest impact will occur in *the Professional, Scientific, and Technical Services* sector ($588 million) and is due to large direct and indirect impacts. This sector benefits from direct services provided to the construction projects as well as services offered to the vendors directly engaged in the construction projects. The third largest output impact will occur in the *Manufacturing* sector ($355 million), with the majority of the impact coming from the direct and indirect impacts.

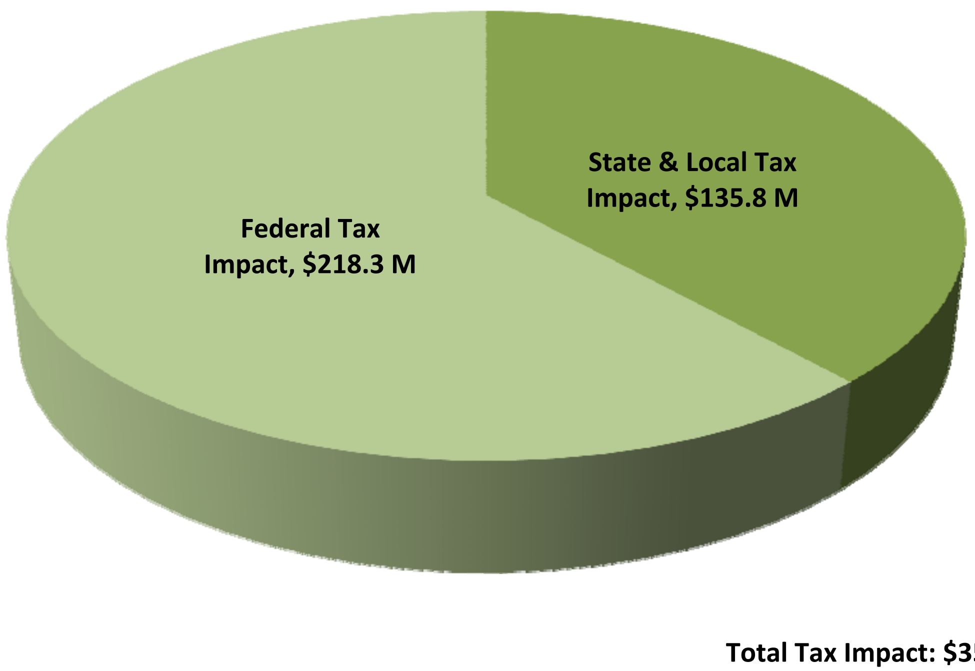
Table 8. Northeast Ohio – Output Impact from Capital Expenditures by Major Economic Sector (in Millions of 2010 Dollars)

Industry Description	Direct	Indirect	Induced	Total
Agriculture, forestry, fish & hunting	0	1.64	0.84	2.47
Mining	0	9.98	1.31	11.29
Utilities	0.02	12.35	13.44	25.80
Construction	1,514.43	4.90	4.84	1,524.17
Manufacturing	196.20	132.53	26.18	354.91
Wholesale trade	0	68.86	42.16	111.01
Retail trade	0.23	36.51	87.11	123.85
Transportation & warehousing	0	36.55	16.47	53.02
Information	0.28	44.16	32.29	76.73
Finance & insurance	7.52	60.60	100.57	168.70
Real estate & rental	0	64.92	153.84	218.75
Professional- scientific & tech services	308.11	243.03	37.25	588.38
Management of companies	0	23.01	7.70	30.71
Administrative & waste services	2.68	55.72	20.18	78.57
Educational services	0	0.31	13.55	13.86
Health & social services	0	0.01	117.61	117.62
Arts- entertainment & recreation	0	2.39	12.36	14.75
Accommodation & food services	0	16.64	35.96	52.60
Other services	0	37.36	32.22	69.58
Government & non NAICs	0	7.73	12.17	19.90
Total	**2,029.47**	**859.20**	**768.03**	**3,656.70**

TAX IMPACT

The District's capital expenditures between 2012 and 2016 will increase tax revenues during this 5-year period by a total of $354.0 million (Figure 9). Of that, state and local governments in Northeast Ohio will benefit from increased tax revenues of $135.8 million. Federal tax revenues during the 5-year period will increase by $218.3 million.

Figure 9. Northeast Ohio – Tax Impact of Capital Expenditures, 2012-2016



CAPITAL PROJECTS: ECONOMIC IMPACTS IN CUYAHOGA COUNTY, 2012-2016

This section describes the economic impacts of the District's capital expenditures occurring in Cuyahoga County. As with the previous section, the impact is estimated for the 5-year period between 2012 and 2016.

CAPITAL EXPENDITURES

Table 10 shows the total capital expenditures, by year, that the District is planning to spend in Cuyahoga County. Table 9 is separated into sections detailing expenditures for materials and labor, with the materials section broken out into 32 different industries.

The total expenditures over the study period amount to $544.9 million. The totals for each year differ based on the projects that will be underway at that time. The year with the lowest estimated capital spending in Cuyahoga County is 2015 with $60.9 million and the year with the highest capital spending is 2013 with $146.0 million. On average over the 5-year period, materials account for 46.2% and labor accounts for 53.8% of total capital expenditures.

Over the entire period, the highest capital expenditures occur in *Construction of other new nonresidential structures* with over $80.0 million. The next highest level of expenditures occur in *Maintenance and repair construction of nonresidential structures* ($ 44.7 million), *Material handling equipment manufacturing* ($37.3 million), and *Ready-mix concrete manufacturing* ($25.4 million).

Over the 5-year period, labor costs account for $293.2 million which is 53.8% of total capital expenditures. The amount spent on labor differs across time from a low of $33.2 million (54.6% of total expenditures) in 2015 to a high of $82.4 million (56.4% of total expenditures) in 2013.

Table 9. Cuyahoga County – Capital Expenditures (in Dollars), 2012-2016

Industry Description	2012	2013	2014	2015	2016
Materials Total	**67,887,003**	**63,648,482**	**36,050,324**	**27,681,684**	**56,424,014**
Electric power generation, transmission, and distribution	10,389	7,916	1,004	0	0
Construction of other new nonresidential structures	31,971,480	23,225,179	3,892,051	5,316,192	15,621,256
Maintenance and repair construction of nonresidential structures	7,033,064	7,884,196	11,655,772	13,663,352	4,489,333
Asphalt paving mixture and block mfg	170,916	130,222	16,523	0	569
Asphalt shingle and coating materials mfg	337,267	183,184	111,691	263,203	385,117
Other plastics product mfg	677,154	278,052	119,985	111,165	3,747,046
Ready-mix concrete mfg	4,662,986	9,183,898	3,609,412	988,566	6,964,352
Concrete pipe, brick, and block mfg	526,307	428,364	145,321	40,142	315,303
Lime and gypsum product mfg	244,332	53,401	27,557	24,198	47,005
Steel product mfg from purchased steel	1,374,597	1,320,567	3,247,749	934,877	982,955
Aluminum product mfg from purchased aluminum	0	0	0	20,074	8,476
Ornamental and architectural metal products mfg	250,904	102,709	66,293	42,040	98,206
Fabricated pipe and pipe fitting mfg	3,024,062	2,424,975	1,707,157	505,605	1,446,027
Construction machinery mfg	5,814,095	10,272,518	2,583,545	1,349,366	2,839,981
Air purification and ventilation equipment mfg	58,200	0	0	0	0
Air conditioning, refrigeration & warm air heating equipment mfg	0	20,250	0	32,409	13,683
Pump and pumping equipment mfg	0	0	0	441,107	1,236,605
Material handling equipment mfg	8,054,635	5,873,127	7,010,542	2,875,866	13,475,848
Industrial process variable instruments mfg	236,420	178,419	39,346	121,342	556,570
Totalizing fluid meters and counting devices mfg	100,000	0	0	0	0
Analytical laboratory instrument mfg	16,880	22,500	11,880	0	0
Switchgear and switchboard apparatus mfg	2,025,733	1,054,322	310,590	202,577	1,319,203
Custom architectural woodwork and millwork mfg	75,505	42,308	32,511	40,896	258,097
Showcase, partition, shelving, and locker mfg	194,050	95,112	71,612	78,161	164,035
Retail Stores - Motor vehicle and parts	264,000	93,000	263,000	0	0
Securities, commodity contracts, investments & related activities	259,708	271,354	497,545	347,042	1,467,751
Insurance carriers	477,653	482,594	626,658	281,215	972,763
Labor Total	**76,399,496**	**82,381,624**	**46,857,379**	**33,230,504**	**54,336,955**
Total Expenditure	**144,286,499**	**146,030,106**	**82,907,703**	**60,912,188**	**110,760,969**

Capital Projects: Total Economic Impact

The economic impact estimates for Cuyahoga County are summarized in Table 10. Over 13,000 jobs will be created as a result of capital expenditures of the District between 2012 and 2016. Labor Income will increase by over $615 million. The value-added impact (measure of the value-added to production less intermediary goods) is almost $813 million. Output (total value of goods and services) in Cuyahoga County will increase by almost $1.9 billion.

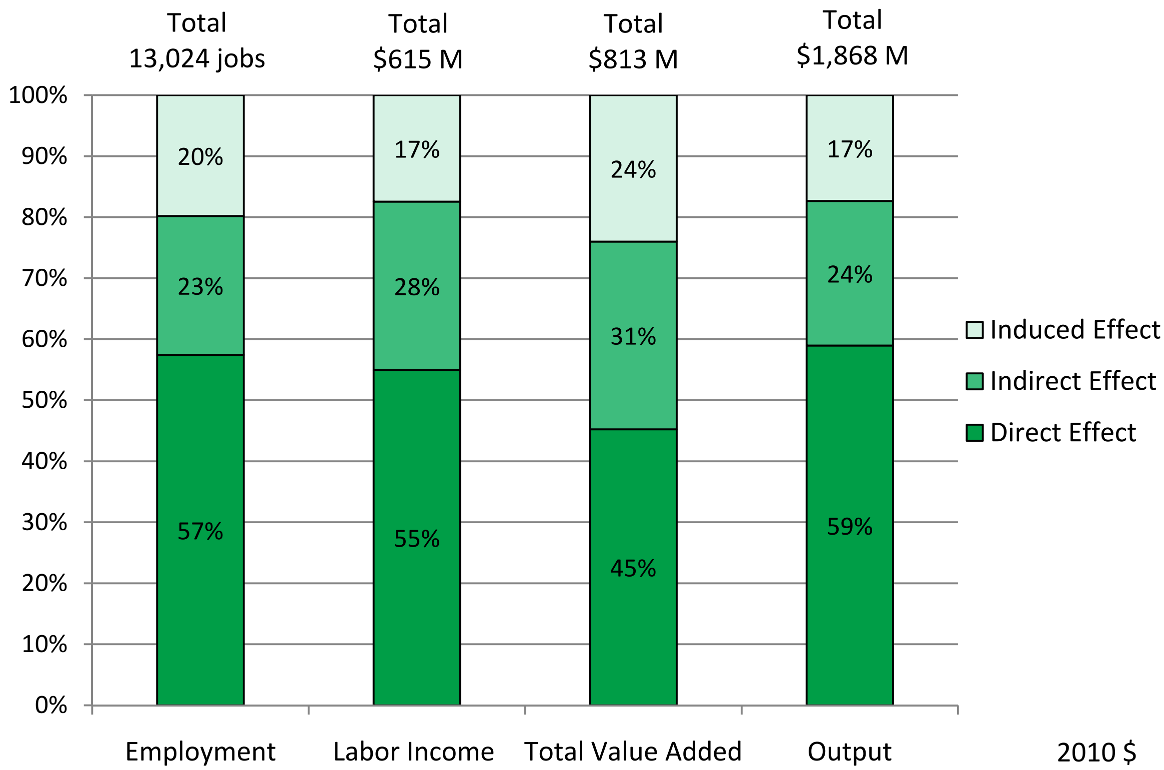
The capital expenditures of the District will also have an impact on taxes. State and local taxes will increase by $61.7 million and federal taxes will increase by $107.8 million for a total impact of $169.5 million.

Table 10. Cuyahoga County – Economic Impact of Capital Expenditures, 2012-2016 (Impact in 2010 Dollars)

Impact Type	Employment	Labor Income ($M)	Total Value Added ($M)	Output ($M)
Direct Impact	7,479	337.99	367.65	1,100.98
Indirect Impact	2,966	169.91	250.04	442.73
Induced Impact	2,579	107.42	194.97	323.80
Total Impact	**13,024**	**615.32**	**812.66**	**1,867.51**

Figure 10 shows the economic impact in Cuyahoga County in terms of direct, indirect, and induced effects. The direct impact on employment contributes almost 7,500 jobs, or 57% of the total employment impact, which represents the number of new employees that will work on the construction projects. The indirect employment effect of almost 3,000 (23% of total), represents the employees that will work for the companies that sell goods and services to the vendors working on the District's construction projects. The induced impact of over 2,500 employees (20% of total), represents the employees in industries that experience an increased demand from households in the region that are paid by the District capital projects, directly or indirectly. The induced employment exists in industries that benefit from the spending patterns of households.

Figure 10. Cuyahoga County – Impacts of Capital Projects: Direct, Indirect, and Induced impacts as Percentage of Total Impact



Looking across all impact measures (employment, labor income, total value added, and output), the direct effect represents the majority of the impact in each case ranging from 45% to 59% of the total. The indirect impacts range from 23% to 31% and the induced impacts range from 17% to 24%.

EMPLOYMENT IMPACT[5]

As mentioned previously, over 13,000 jobs will be created in Cuyahoga County as a result of the District's capital expenditures. The top 10 industries that will be most affected in Cuyahoga County account for 73% of the total employment. Three industries have an impact of over 1,000 jobs: *Construction of other new nonresidential structures* (3,920), *Architectural, engineering, and related services* (2,494), and *Maintenance and repair construction of nonresidential structures* (1,382). These three industries alone account for almost 60% of the total employment that will be created. Also, almost all of the employment created from them is a direct effect of the capital expenditures, unlike the remaining seven industries in the top 10 which have higher indirect and induced employment.

[5] See Appendix B for tables and figures related to the employment impact in Cuyahoga County.

When detailed industries (as discussed in the last paragraph like *Construction of other new nonresidential structures* and *Architectural, engineering, and related services*) are aggregated into major sectors, a larger picture on how capital expenditures will affect the economy of Cuyahoga County is drawn. Due to the large direct impact, the largest industry that will be impacted is *Construction* (5,314 total jobs). The second highest industry in terms of employment is *Professional-scientific and technical services* (2,999 total jobs) which has the highest indirect impact among the major sectors. *Retail Trade* has the third highest total impact as 709 jobs will be created. The industry with the highest induced impact is *Health and social services* which will yield 568 jobs.

Labor-Income Impact[6]

The capital expenditures of the District between 2012 and 2016 will create additional labor income (household earnings) of $615.32 million in Cuyahoga County. Over 70% of the labor-income impact comes from the top 10 industries. Mirroring the impact in employment, the top three industries in labor income impact are *Construction of other new nonresidential structures* ($159.8 million), *Architectural, engineering, and related services* ($123.6 million), and *Maintenance and repair construction of nonresidential structures* ($75.2 million). The labor-income impact of these three top industries was mainly in the direct effect. Industries that benefit the most from household spending and have the largest induced impact include *Private Hospitals* ($10.43 million), *Offices of physicians, dentists, and other health practitioners* ($8.79 million), and *Wholesale trade businesses* ($6.72 million).

Examining the major sectors that affect labor income in Cuyahoga County shows that employees in *Construction* will earn an additional $235.5 million, and employees in *Professional-scientific and technical services* will earn an additional $159.7 million. These two industries alone account for 64% of the total direct impact. The industry with the highest indirect impact is *Professional-scientific & technical services* and the industry with the highest induced impact is *Health and social services.*

Value-Added Impact[7]

The capital expenditures will create value added (defined as total value of all goods and services less intermediary goods or gross domestic product) of $812.66 million in Cuyahoga County between 2012 and 2016. The top 10 industries account for over 65% of the total value-added impact. Just as with employment and labor income, the top three industries for value-added impact are *Construction of other new nonresidential structures* ($172.28 million), *Architectural, engineering, and related services* ($126.09 million), and *Maintenance and repair construction of nonresidential structures* ($79.36 million) and these three are the only ones with a large direct impact. The value added in the other seven highest industries is due to indirect and induced effects. The highest indirect effect occurred in *Architectural, engineering, and related services* and the highest induced effect

[6] See Appendix B for tables and figures related to the labor-income impact in Cuyahoga County.

[7] See Appendix B for tables and figures related to the value-added impact in Cuyahoga County.

occurred in *Imputed rental activity for owner-occupied dwellings*.

Construction leads the major sectors with the highest value-added impact ($252.34 million) in Cuyahoga County. Rounding out the top three are *Professional- scientific and technical services* ($173.39 million) and *Real estate and rental* ($71.87 million). The majority of the impact in *Construction* came from the direct effect. The impact in *Professional- scientific and technical services* is split mostly between direct and indirect effects. The *Real estate and rental* industry is affected mostly through the induced effect of household spending.

Output Impact[8]

The District's capital expenditures will yield an output impact of almost $1.87 billion between 2012 and 2016, which means that additional $1.87 billion of goods and services will be produced in Cuyahoga County as a result of the District's construction projects. The top 10 industries in output impact represent over 70% of the total impact. As with all of the other impact measures (employment, labor income, and value added) the same three industries fill the top three spots: *Construction of other new nonresidential structures* ($585.00 million), *Architectural, engineering, and related services* ($308.32 million), and *Maintenance and repair construction of nonresidential structures* ($161.89 million). The output impact in *Construction of other new nonresidential structures* and *Maintenance and repair construction of nonresidential structures* is due mostly to the direct effect. The impact in *Architectural, engineering, and related services* is mostly a direct effect, but has a large indirect component as well. The highest indirect effect is in *Architectural, engineering, and related services* and the highest induced effect is in *Imputed rental activity for owner-occupied dwellings*.

Examining the detailed industries shows that in every impact (employment, labor income, value added, and output), the top two industries are the same: *Construction* ($748.00 million in output) *and Professional- scientific & technical services* ($384.69 million in output). Just as in labor income, the third highest industry in terms of output is the *Manufacturing* industry with $186.51 million in output. *Construction* has the highest direct effect, *Professional- scientific & technical services* has the largest indirect effect, and *Real estate and rental* has the highest induced effect.

Tax Impact[9]

The capital expenditures of the District will increase the total tax revenues by $169.5 million between 2012 and 2016. The state of Ohio and local governments will receive an additional $61.7 million in taxes. Federal government tax revenues will increase by $107.8 million.

[8] See Appendix B for tables and figures related to the output impact in Cuyahoga County.

[9] See Appendix B for tables and figures related to the tax impact in Cuyahoga County.

OPERATING EXPENDITURES: ECONOMIC IMPACTS IN NORTHEAST OHIO 7-COUNTY AREA, 2012-2016

This section outlines the economic impacts of the estimated operating expenditures of the District in Northeast Ohio for the years between 2012 and 2106.

OPERATING EXPENDITURES

Table 11 details the estimated operating expenditures of the District in Northeast Ohio for the years between 2012 and 2016 and provides total expenditures for both materials (broken out by industry) and labor (payroll of District staff). The estimates are based on the current year's budget and project into the future. The 5-year estimated expenditures on District operation total over \$529.8 million, with increases in every year to account for inflation. A total of \$273.82 million will be spent on materials and \$256.01 million will be spent on labor. Across all five years, the amount spent on salaries is just slightly less than half of the total cost of operation.

Over the five years combined, *Electric power generation, transmission, and distribution* is the largest line item with \$60.84 million in cost. This is followed by *Natural gas distribution* with \$43.19 million, *Other state and local government enterprises* with \$36.49 million, *Management, scientific, and technical consulting services* with \$21.10 million, and *Legal services* with \$21.02 million.

Table 11. Northeast Ohio – Operating Expenditures (in Dollars), 2012-2016

Industry Description	2012	2013	2014	2015	2016
Materials Total	**49,395,305**	**51,938,489**	**54,514,281**	**57,468,205**	**60,505,426**
Electric power generation, transmission, and distribution	11,458,701	11,802,462	12,156,536	12,521,232	12,896,869
Natural gas distribution	6,664,179	7,530,523	8,509,491	9,615,724	10,865,769
Water, sewage and other systems	1,392,311	1,531,542	1,684,696	1,853,166	2,038,482
Construction of other new nonresidential structures	812,459	826,376	841,054	856,543	872,902
Maintenance & repair construction of nonresidential	3,256,815	3,402,487	3,550,539	3,701,133	3,854,447
Printing	118,349	120,473	122,539	124,789	126,984
Wholesale trade	1,172,742	1,221,567	1,273,751	1,329,814	1,389,782
Retail - Motor vehicle and parts	310,620	322,621	334,782	347,117	359,638
Retail - Building material and garden supply	735,898	780,248	826,334	875,160	926,969
Retail - Gasoline stations	30,727	32,604	34,498	36,409	38,338
Retail - Clothing and clothing accessories	170,675	177,168	180,736	184,381	188,105
Retail - Miscellaneous	13,800	13,800	13,800	13,800	13,800
Air transportation	88,173	90,234	92,356	94,541	96,793
Truck transportation	53,353	54,581	55,913	57,357	58,923
Periodical publishers	16,608	16,670	16,754	16,840	16,928
Telecommunications	990,817	1,139,440	1,310,355	1,506,909	1,732,945
Commercial & industrial machinery & equipment rental & leasing	62,999	64,469	66,483	68,043	69,649
Legal services	4,025,500	4,114,229	4,203,214	4,292,462	4,381,982
Architectural, engineering, and related services	86,810	88,297	89,866	91,521	93,269
Management, scientific, and technical consulting services	4,040,972	4,129,966	4,219,230	4,308,774	4,398,605
Environmental and other technical consulting services	119,946	122,000	124,167	126,454	128,869
Advertising and related services	745,624	771,740	797,896	824,092	850,330
Photographic services	21,001	21,360	21,740	22,140	22,563
Employment services	54,106	55,729	57,401	59,123	60,897
Investigation and security services	36,738	37,367	38,031	38,731	39,471
Services to buildings and dwellings	320,681	326,174	331,968	338,082	344,539
Waste management and remediation services	1,781,433	1,882,429	1,824,655	1,928,194	1,873,135
Junior colleges, colleges, universities, and professional schools	106,090	109,273	112,551	115,927	119,405
Other educational services	562,767	578,724	595,119	611,964	629,273
Child day care services	61,969	66,427	71,189	76,280	81,725
Hotels and motels, including casino hotels	17,635	18,047	18,471	18,908	19,359
Food services and drinking places	52,904	54,140	55,413	56,725	58,076
Automotive repair and maintenance, except car washes	132,300	138,915	145,861	153,154	160,811
Commercial & industrial machinery & equipment	2,693,366	2,898,615	3,120,794	3,361,444	3,622,246
Grantmaking, giving, and social advocacy organizations	117,748	119,765	121,892	124,137	126,508
Civic, social, professional, and similar organizations	94,109	94,465	94,942	95,429	95,928
Postal service	61,969	66,427	71,189	76,280	81,725
Other federal government enterprises	35,324	35,929	36,568	37,241	37,952
Other state and local government enterprises	6,877,086	7,081,206	7,291,509	7,508,186	7,731,434
Labor Total	**47,282,563**	**49,374,838**	**51,235,380**	**52,884,271**	**55,230,730**
Total Expenditures	**96,677,868**	**101,313,327**	**105,749,661**	**110,352,476**	**115,736,156**

OPERATING EXPENDITURES: TOTAL ECONOMIC IMPACT

The economic impact results of the operating expenditures in Northeast Ohio are summarized in Table 12. Between 2012 and 2016, over 5,000 jobs will be created in Northeast Ohio as a result of the operating expenditures of the District. Labor income (household earnings) will increase by $468 million, total value added (value of all goods and services excluding intermediary goods) will increase by $628 million, and output will increase by $981 million. The operating expenditures of the District will increase tax revenues by $89.4 million including an increase of $44.4 million in state and local taxes and $45.0 million in federal taxes

Table 12. Northeast Ohio – Economic Impact of Operating Expenditures, 2012-2016 (Impact in 2010 Dollars)

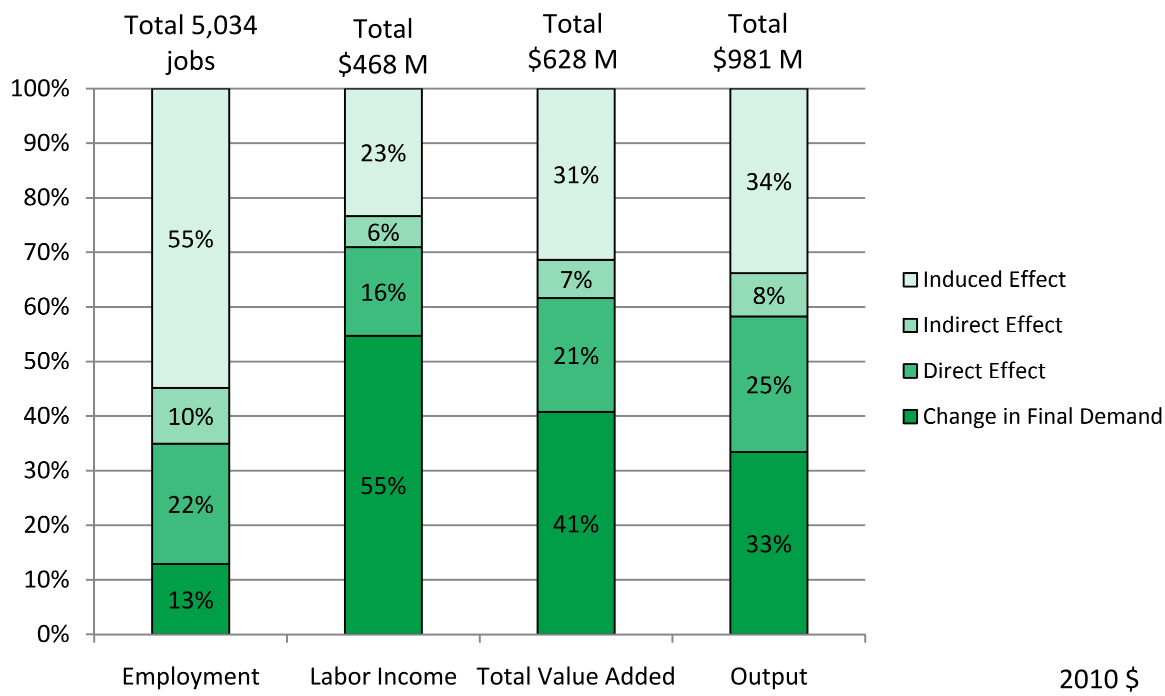
Impact Type	Employment	Labor Income ($M)	Total Value Added ($M)	Output ($M)
Change in Final Demand	648	256.01	256.01	327.51
Direct Impact	1,112	75.72	130.85	243.80
Indirect Impact	513	26.80	44.31	77.70
Induced Impact	2,760	109.17	196.79	331.91
Total Impact	**5,034**	**467.69**	**627.96**	**980.92**

Figure 11 provides a summary of the economic impact of the District's operating expenditures in Northeast Ohio between 2012 and 2016. This figure shows the percentage of the total impact which is derived from each of the impacts: the change in final demand, direct impact, indirect impact, and induced impact. The change in final demand represents the impact of the staff that works for the District. The change in final demand accounts for 648 jobs (12.9% of the total impact). The direct employment impact (suppliers/vendors that sell to the District) is more than 1,100 jobs and accounts for 22.1% of the total impact. Over 500 employees will work for companies who sell goods and services to the vendors directly involved with the District. This indirect employment is 10.2% of the total impact. More than 2,700 employees, 54.8% of the total impact, will work in industries that see an increased demand from household spending representing the induced effect.

Of the additional labor income, 54.7% of the total impact is represented by the change in final demand for a total of $256.01 million. The direct effect of $75.72 million is 16.2% of the total impact, while the indirect effect is 5.7% and the induced effect is 23.3%. The $256.01 million change in final demand for value added represents 40.8% of the total value-added impact. The remaining effects represent 20.8% (direct), 7.1% (indirect), and 31.3% (induced). The total output impact of $980.92 million is split between a 33.4% change in final demand, 24.9% direct effect, 7.9% indirect effect, and 33.8% induced impact.

In the employment impact, the induced effect accounts for the largest share, while the induced effect is the second highest percentage of the labor income, value added and output impacts. The indirect effects make up the smallest percentage of each of the four measures.

Figure 11. Northeast Ohio – Impacts of Operating Expenditures: Direct, Indirect, and Induced Impacts as Percentage of Total Impact

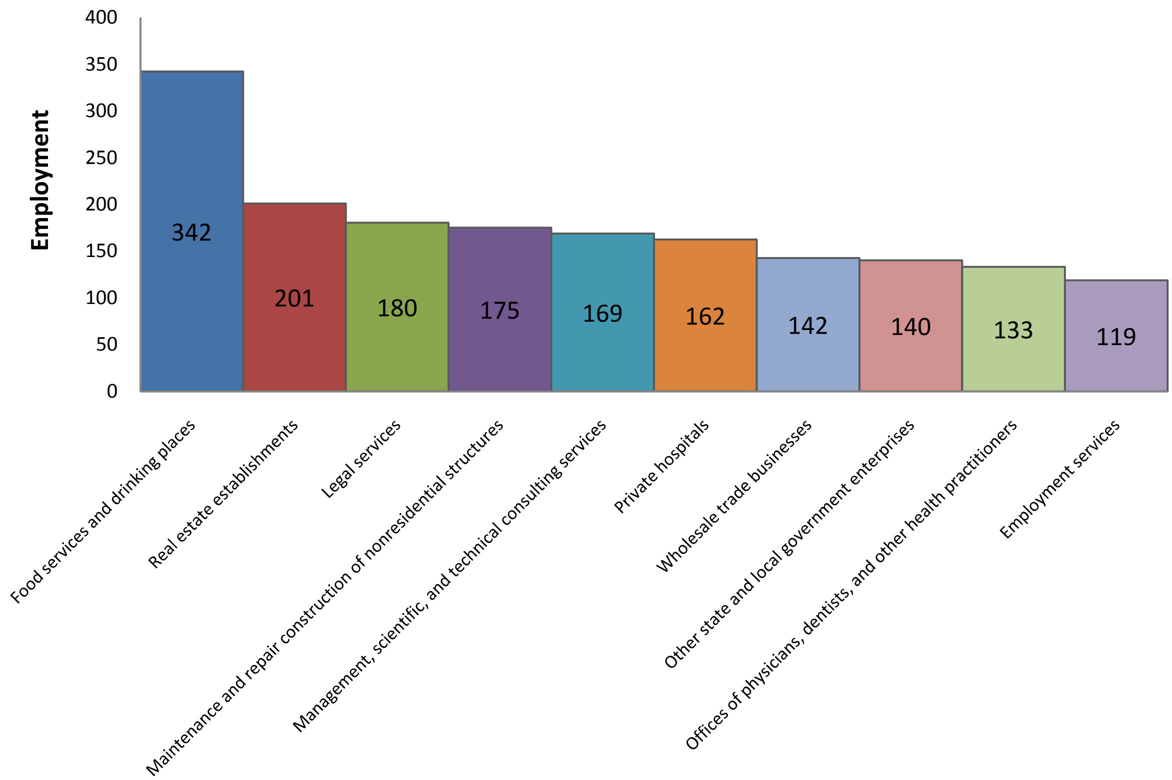


EMPLOYMENT IMPACT

The employment impact measures the number of jobs that will be created in Northeast Ohio because of the operating expenditures of the District between 2012 and 2016. Over 5,000 jobs will be created due to the operation of the District.

The top 10 industries with the highest total employment are shown in Figure 12. The top 10 industries account for 40.2% of the total direct, indirect, and induced jobs created. The *Food services and drinking places* industry has the largest impact with 342 jobs. Other industries with large impact include *Real estate establishments* (201 jobs), *Legal services* (180 jobs), *Maintenance and repair construction of nonresidential structures* (175 jobs), *Management, scientific, and technical consulting services* (169 jobs), and *Private hospitals* (162 jobs). Some of the top 10 industries represent the type of goods and services purchased by households where additional demand creates new employment. Other top industries represent industries that benefit from the District's purchasing patterns.

Figure 12. Northeast Ohio – Top 10 Industries with the Highest Total Employment from Operating Expenditures



Industry Description	Direct	Indirect	Induced	Total
Food services and drinking places	5	37	300	342
Real estate establishments	0	39	162	201
Legal services	126	14	40	180
Maintenance and repair construction of nonresidential structures	139	28	8	175
Management, scientific, and technical consulting services	145	11	13	169
Private hospitals	0	0	162	162
Wholesale trade businesses	30	15	98	142
Other state and local government enterprises	122	5	14	140
Offices of physicians, dentists, and other health practitioners	0	0	133	133
Employment services	8	49	62	119
Total Top 10	574	198	992	1,764
Total Industry	1,112	513	2,760	4,386
Percentage of 10 Industries	51.58%	38.62%	35.94%	40.22%

* These numbers represent only the top 10 industries in terms of direct, indirect, and induced impacts

Table 13 shows the aggregation of detailed industries into major sectors of the regional economy. The largest major sector is *Health & social services* which will increase by 592 total jobs, almost entirely through the induced effect which is due to household spending. *Retail Trade* ranks second with 582 jobs, again mostly in the induced effect. The only other major industry that will gain over 500 jobs is *Professional- scientific & tech services* which will increase by 544 jobs which is mainly due to non-payroll District expenditures. This industry has the largest direct effect and the largest indirect effect of all of the major industries.

Table 13. Northeast Ohio – Employment Impact from Operating Expenditures by Major Economic Sector

Industry Description	Direct	Indirect	Induced	Total
Agriculture, forestry, fish & hunting	0	0	5	5
Mining	0	20	1	22
Utilities	157	2	9	168
Construction	164	32	20	216
Manufacturing	3	13	29	45
Wholesale trade	30	15	98	142
Retail trade	25	14	543	582
Transportation & warehousing	3	28	55	86
Information	13	19	42	74
Finance & insurance	0	35	185	219
Real estate & rental	1	44	174	219
Professional- scientific & tech services	314	106	124	544
Management of companies	0	9	15	24
Administrative & waste services	83	101	138	323
Educational services	58	1	104	163
Health & social services	8	0	584	592
Arts- entertainment & recreation	0	6	68	74
Accommodation & food services	6	37	301	345
Other services	118	18	236	373
Government & non NAICs	128	12	29	169
Total	**1,112**	**513**	**2,760**	**4,386**
Change in final demand*	648			
Direct impact	1,112			
Indirect impact	513			
Induced impact	2,760			
Total employment impact	**5,034**			

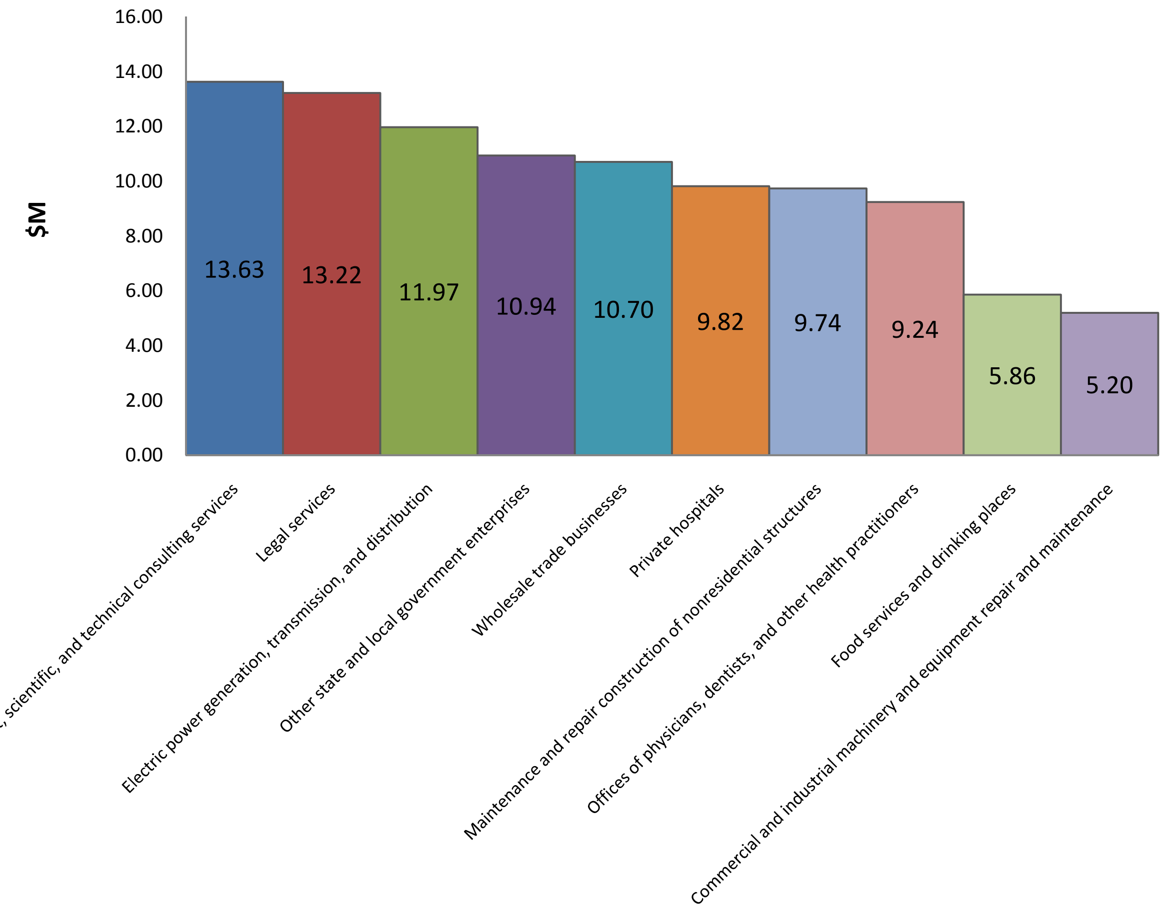
* For employment impact, the change in final demand equals the number of full-time equivalent employees working for the District.

LABOR-INCOME IMPACT

Labor income measures the additional income earned by households in Northeast Ohio between 2012 and 2016 because of the operating expenditures of the District. The total labor income increase in Northeast Ohio is $467.69 million over the 5-year period.

Of the direct, indirect, and induced labor income impact, the top 10 industries represent 47% of the total impact (Figure 13). The *Management, scientific, and technical consulting services* industry has the highest impact with $13.63 million, followed by *Legal Services* with $13.22 million and *Electric power generation, transmission, and distribution* with $11.97 million. The majority of these impacts come from the direct effect created through the District's spending. The three industries with the highest induced effect, created through household spending, are *Private hospitals* ($9.82 million in induced impact),*Offices of physicians, dentists, and other health practitioners* ($9.24 million in induced impact), and *Wholesale trade businesses* ($7.33 million in induced impact with a total impact of $10.70 million).

Figure 13. Northeast Ohio – Top 10 Industries with the Highest Total Labor Income from Operating Expenditures (in Millions of 2010 Dollars)



Industry Description	Direct	Indirect	Induced	Total
Management, scientific, and technical consulting services	11.68	0.87	1.08	13.63
Legal services	9.26	1.04	2.92	13.22
Electric power generation, transmission, and distribution	10.85	0.17	0.95	11.97
Other state and local government enterprises	9.49	0.38	1.07	10.94
Wholesale trade businesses	2.22	1.15	7.33	10.70
Private hospitals	0.00	0.00	9.82	9.82
Maintenance and repair construction of nonresidential structures	7.72	1.54	0.47	9.74
Offices of physicians, dentists, and other health practitioners	0.00	0.00	9.24	9.24
Food services and drinking places	0.09	0.64	5.13	5.86
Commercial & industrial machinery & equipment repair & maintenance	4.80	0.18	0.22	5.20
Total Top 10	56.12	5.97	38.24	100.33
Total Industry	75.72	26.80	109.17	211.68
Percentage of 10 Industries	74.11%	22.29%	35.02%	47.39%

* These numbers represent only the top 10 industries in terms of direct, indirect, and induced impacts

Table 14 examines the labor-income impact by major economic sector. The three largest major sectors in terms of labor income are *Professional-scientific and technical services* with $38.38 million, *Health and social services* with $27.64 million, and *Utilities* with $19.56 million.

The *Professional- scientific and technical services* sector has the highest direct and indirect impacts ($23.00 million and $7.24 million, respectively). The *Health and social services* sector has the highest induced impact ($27.51 million).

Table 14. Northeast Ohio – Labor Income Impact from Operating Expenditures by Major Economic Sector (in Millions of 2010 Dollars)

Industry Description	Direct	Indirect	Induced	Total
Agriculture, forestry, fish & hunting	0.00	0.01	0.08	0.09
Mining	0.00	1.83	0.13	1.96
Utilities	18.11	0.28	1.17	19.56
Construction	8.97	1.70	0.95	11.61
Manufacturing	0.18	0.97	1.87	3.02
Wholesale trade	2.22	1.15	7.33	10.70
Retail trade	0.82	0.40	15.10	16.33
Transportation & warehousing	0.23	1.42	2.80	4.45
Information	0.97	1.17	2.50	4.64
Finance & insurance	0.00	2.52	12.89	15.41
Real estate & rental	0.06	1.22	4.45	5.73
Professional- scientific & tech svcs	23.00	7.24	8.13	38.38
Management of companies	0.00	0.90	1.55	2.45
Administrative & waste services	3.56	3.52	4.44	11.52
Educational svcs	1.42	0.03	2.80	4.25
Health & social services	0.13	0.00	27.51	27.64
Arts- entertainment & recreation	0.00	0.15	1.78	1.93
Accommodation & food services	0.12	0.64	5.17	5.94
Other services	5.89	0.72	6.27	12.88
Government & non NAICs	10.03	0.93	2.26	13.22
Total	**75.72**	**26.80**	**109.17**	**211.68**
Change in final demand*	256.01			
Direct impact	75.72			
Indirect impact	26.80			
Induced impact	109.17			
Total labor income impact	**467.69**			

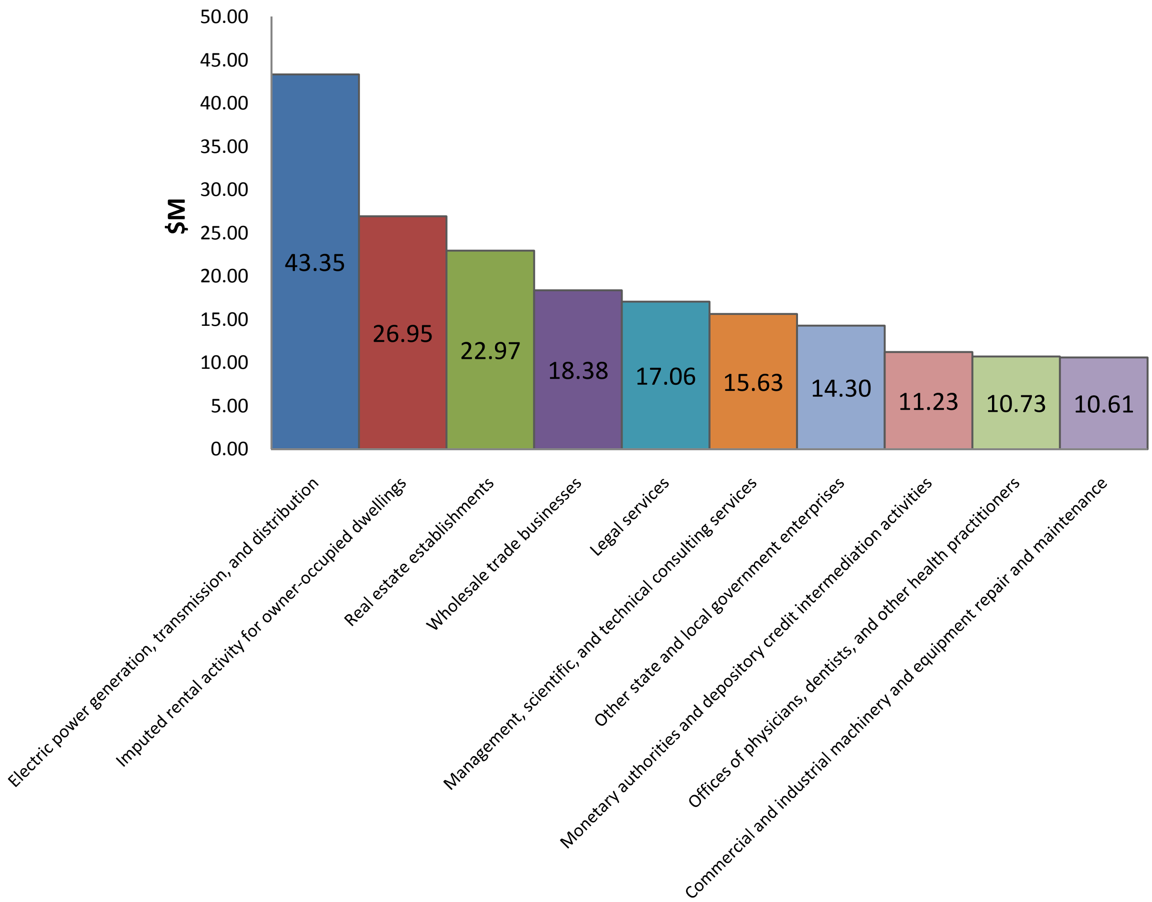
*For labor-income impact, the change in final demand equals the payroll of employees working for the District.

VALUE-ADDED IMPACT

The value-added impact measure corresponds to the measure of Gross Domestic Product. It measures the value of all goods and services produced in Northeast Ohio less the value of intermediary goods that go into the production process (and not for final consumption). As a result of the operating expenditures of the District between the years 2012 and 2016, a $627.96 million increase in value added will be created in Northeast Ohio. The top 10 industries in terms of direct, indirect, and induced impacts which contribute to this increase account for 51.40% of the total (Figure 14).

The top three industries in terms of direct, indirect, and induced impacts are *Electric power generation, transmission, and distribution* ($43.35 million), *Imputed rental activity for owner-occupied dwellings* ($26.95 million), and *Real estate establishments* ($22.97 million). The *Electric power generation, transmission, and distribution* industry has the largest direct impact, the *Real estate establishments* industry has the largest indirect impact, and the *Imputed rental activity for owner-occupied dwellings* industry has the largest induced impact. The *Electric power generation, transmission, and distribution* industry is also the third highest ranked industry in terms of labor-income impact.

Figure 14. Northeast Ohio – Top 10 Industries with the Highest Total Value-Added Impact from Operating Expenditures (in Millions of 2010 Dollars)



Industry Description	Direct	Indirect	Induced	Total
Electric power generation, transmission, and distribution	39.28	0.62	3.45	43.35
Imputed rental activity for owner-occupied dwellings	0.00	0.00	26.95	26.95
Real estate establishments	0.00	4.50	18.47	22.97
Wholesale trade businesses	3.82	1.98	12.58	18.38
Legal services	11.95	1.35	3.76	17.06
Management, scientific, and technical consulting services	13.40	0.99	1.24	15.63
Other state and local government enterprises	12.40	0.50	1.40	14.30
Monetary authorities & depository credit intermediation activities	0.00	3.20	8.03	11.23
Offices of physicians, dentists, and other health practitioners	0.00	0.00	10.73	10.73
Commercial & industrial machinery & equipment repair & maintenance	9.80	0.37	0.44	10.61
Total Top 10	90.64	13.51	87.05	191.20
Total Industry	130.85	44.31	196.79	371.95
Percentage of 10 Industries	69.27%	30.48%	44.24%	51.40%

* These numbers represent only the top 10 industries in terms of direct, indirect, and induced impacts

When the industries are aggregated into major sectors, the same themes emerge as when specific industries are examined (Table 15). The largest sectors in terms of direct, indirect, and induced effects are *Utilities* ($59.02 million), *Real estate & rental* ($51.89 million), and *Professional-scientific and technical services* ($46.40 million). *Utilities* and *Professional-scientific and technical services* had the highest direct effect; *Professional-scientific and technical services* and *Real estate and rental* had the highest indirect effect; and *Real estate and rental* and *Health & social services* had the highest induced impact.

Table 15. Northeast Ohio – Value-Added Impact from Operating Expenditures by Major Economic Sector (in Millions of 2010 Dollars)

Industry Description	Direct	Indirect	Induced	Total
Agriculture, forestry, fish & hunting	0.00	0.01	0.16	0.18
Mining	0.00	4.87	0.34	5.21
Utilities	54.27	0.85	3.90	59.02
Construction	9.43	1.82	1.21	12.45
Manufacturing	0.25	1.45	2.97	4.67
Wholesale trade	3.82	1.98	12.58	18.38
Retail trade	1.33	0.66	24.76	26.74
Transportation & warehousing	0.31	2.09	3.90	6.30
Information	2.58	2.60	5.41	10.59
Finance & insurance	0.00	5.00	21.90	26.90
Real estate & rental	0.12	5.30	46.48	51.89
Professional- scientific & tech services	27.80	8.63	9.97	46.40
Management of companies	0.00	1.21	2.08	3.29
Administrative & waste services	5.31	4.63	5.64	15.57
Educational services	1.71	0.04	3.08	4.82
Health & social services	0.22	0.00	31.99	32.21
Arts- entertainment & recreation	0.00	0.19	2.52	2.71
Accommodation & food services	0.19	0.97	7.75	8.91
Other services	10.60	1.02	7.64	19.27
Government & non NAICs	12.93	1.00	2.50	16.42
Total	**130.85**	**44.31**	**196.79**	**371.95**
Change in final demand*	256.01			
Direct impact	130.85			
Indirect impact	44.31			
Induced impact	196.79			
Total value-added impact	627.96			

*For value-added impact, the change in final demand equals the total District expenditures in Northeast Ohio.

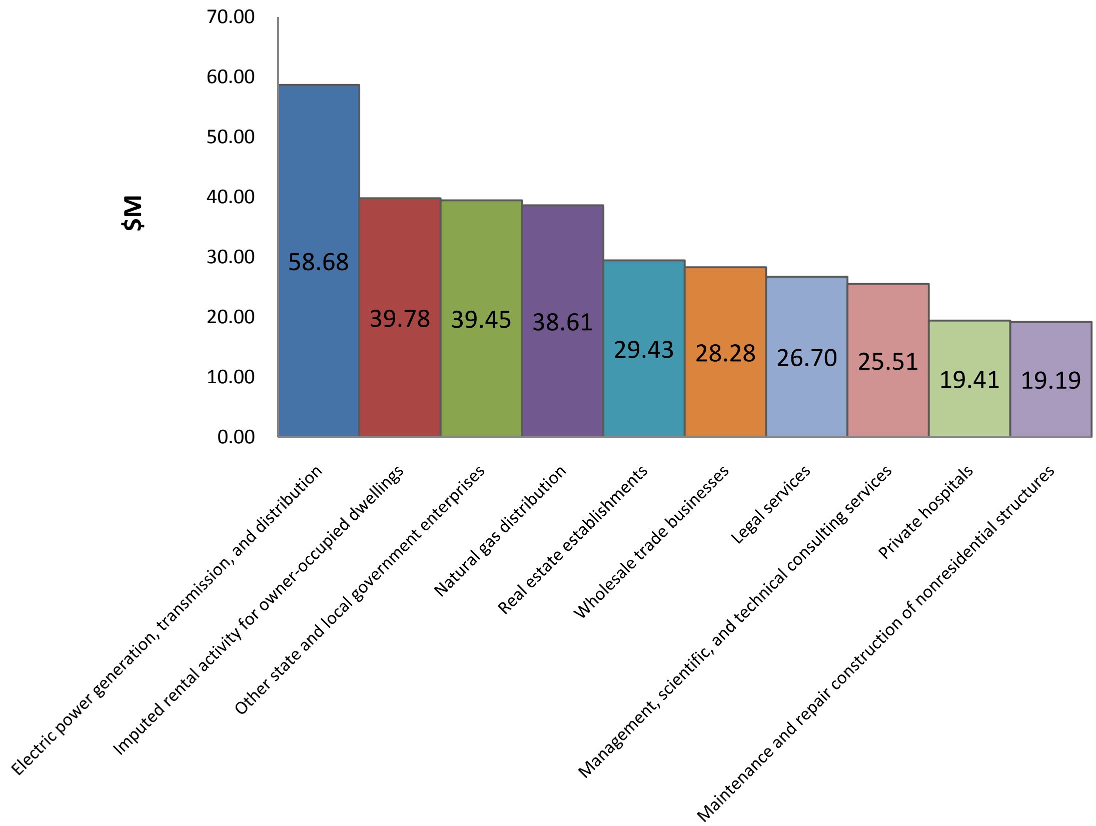
Output Impact

Output measures the value of industry production which is the value of all goods and services produced in the economy. It is higher than the measure of value added because it includes intermediary goods. The operating expenditures of the District in Northeast Ohio between 2012 and 2016 will create a total output impact of $980.92 million, or nearly $1 billion.

The top 10 industries account for just less than 50% of the direct, indirect, and induced impacts (Figure 15). The top industries are: *Electric power generation, transmission, and distribution* ($58.68 million), *Imputed rental activity for owner-occupied dwellings ($*39.78 million), and *Other state and local government enterprises* ($39.45 million). The top two industries in output are the same as the top two industries in value added.

The largest direct impact is in *Electric power generation, transmission, and distribution* ($53.17 million). The largest indirect impact is in *Real estate establishments* ($5.76 million) and the largest induced impact is in *Imputed rental activity for owner-occupied dwellings* ($39.78 million).

Figure 15. Northeast Ohio – Top 10 Industries with the Highest Total Output Impact from Operating Expenditures (in Millions of 2010 Dollars)



Industry Description	Direct	Indirect	Induced	Total
Electric power generation, transmission, and distribution	53.17	0.84	4.66	58.68
Imputed rental activity for owner-occupied dwellings	0.00	0.00	39.78	39.78
Other state and local government enterprises	34.20	1.38	3.86	39.45
Natural gas distribution	36.82	0.66	1.14	38.61
Real estate establishments	0.00	5.76	23.67	29.43
Wholesale trade businesses	5.88	3.04	19.36	28.28
Legal services	18.70	2.11	5.89	26.70
Management, scientific, and technical consulting services	21.86	1.62	2.03	25.51
Private hospitals	0.00	0.00	19.41	19.41
Maintenance and repair construction of nonresidential structures	15.22	3.04	0.93	19.19
Total Top 10	185.85	18.45	120.72	325.03
Total Industry	243.80	77.70	331.91	653.41
Percentage of 10 Industries	76.23%	23.75%	36.37%	49.74%

* These numbers represent only the top 10 industries in terms of direct, indirect, and induced impacts

Table 16 shows the distribution of the output impact across the major economic sectors. The largest impact in terms of direct, indirect, and induced effects are in *Utilities* ($104.95 million), *Professional-scientific and technical services* ($75.80 million), and *Real estate and rental* ($73.20 million). Although in a different order, these same three industries comprise the top industries in value-added impact, also.

The largest direct impact is in the *Utilities* sector, followed by *Professional-scientific and technical service*s. The largest indirect impact is in *Professional-scientific and technical service*s, followed by *Finance and insurance*. The largest induced impacts are in *Real estate and rental* and *Health and social services*; both of which have very small direct and indirect effects.

Table 16. Northeast Ohio – Output Impact from Operating Expenditures by Major Economic Sector (in Millions of 2010 Dollars)

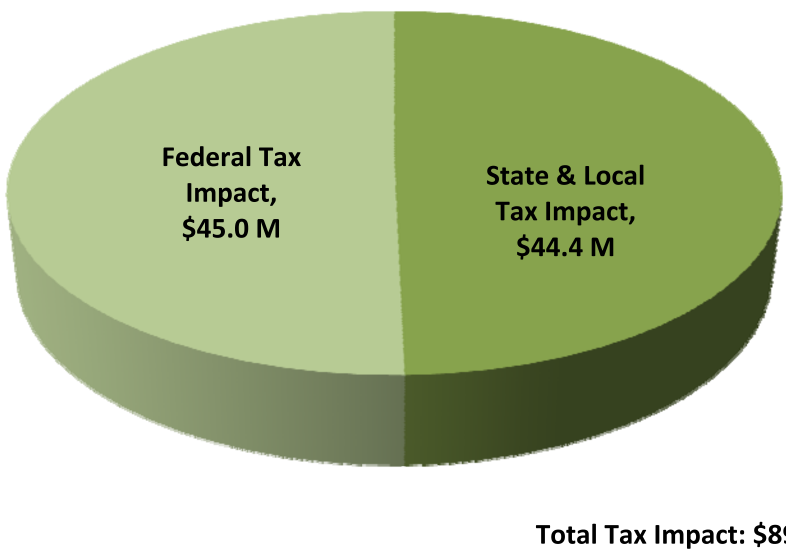
Industry Description	Direct	Indirect	Induced	Total
Agriculture, forestry, fish & hunting	0.00	0.04	0.37	0.41
Mining	0.00	8.23	0.58	8.81
Utilities	97.36	1.58	6.02	104.95
Construction	18.79	3.51	2.05	24.35
Manufacturing	0.55	4.35	11.61	16.51
Wholesale trade	5.88	3.04	19.36	28.28
Retail trade	2.00	0.96	36.53	39.49
Transportation & warehousing	0.71	3.87	7.03	11.61
Information	6.22	6.90	14.14	27.27
Finance & insurance	0.00	8.30	42.96	51.25
Real estate & rental	0.30	7.36	65.54	73.20
Professional- scientific & tech services	45.40	14.15	16.25	75.80
Management of companies	0.00	1.96	3.38	5.33
Administrative & waste services	10.92	7.25	8.76	26.93
Educational services	3.47	0.08	5.50	9.05
Health & social services	0.34	0.00	51.73	52.08
Arts- entertainment & recreation	0.00	0.35	5.28	5.63
Accommodation & food services	0.36	1.95	15.62	17.93
Other services	16.65	1.79	13.88	32.32
Government & non NAICs	34.84	2.04	5.33	42.21
Total	**243.80**	**77.70**	**331.91**	**653.41**
Change in final demand*	327.51			
Direct impact	243.80			
Indirect impact	77.70			
Induced impact	331.91			
Total output impact	980.92			

*For value-added impact, the change in final demand equals the total District expenditures in Northeast Ohio.

TAX IMPACT

The operating expenditures of the District between 2012 and 2016 will increase tax revenues by a total of $89.4 million (Figure 16). State and local governments will benefit from $44.4 million in increased tax revenues. The federal government will benefit from $45.0 million in increased tax revenues in the 5-year period.

Figure 16. Northeast Ohio – Tax Impact of Operating Expenditures, 2012-2016



OPERATING EXPENDITURES: ECONOMIC IMPACTS IN CUYAHOGA COUNTY, 2012-2016

This section outlines the economic impact of the District's operating expenditures in Cuyahoga County between the years 2012 and 2016.

OPERATING EXPENDITURES

Table 17 shows, by year, the total operating expenditures that the District is planning to spend in the county. Materials and labor are separated, with the materials further divided into the 32 different industries where the District spends money.

The estimated operating expenditures in Cuyahoga County between the years 2012 and 2016 total $440.34 million. The total each year is projected spending estimates based on the current budget, with increases in each year to account for inflation. On average over the 5 years, materials account for 55.5% of the total expenditures and labor accounts for 44.5% of the total.

Over the 5 years, the largest operating expenditures in Cuyahoga County occur in *Electric power generation, transmission, and distribution* ($60.84 million), *Natural gas distribution* ($43.19 million), and *Other state and local government enterprises* ($36.17 million). The last industry is a result of the District paying the City of Cleveland for the administration and collection of the user fees for sewer service. The top three industries in terms of operating expenditures account for 57.4% of all of the money spent on materials in Cuyahoga County.

Table 17. Cuyahoga County – Operating Expenditures (in Dollars), 2012-2016

Industry Description	2012	2013	2014	2015	2016
Materials Total	**43,840,247**	**46,191,146**	**48,599,612**	**51,346,758**	**54,201,032**
Electric power generation, transmission, and distribution	11,458,701	11,802,462	12,156,536	12,521,232	12,896,869
Natural gas distribution	6,664,179	7,530,523	8,509,491	9,615,724	10,865,769
Water, sewage and other systems	1,392,311	1,531,542	1,684,696	1,853,166	2,038,482
Construction of other new nonresidential structures	462,396	470,316	478,670	487,486	496,796
Maintenance & repair construction of nonresidential	1,989,019	2,091,880	2,196,089	2,301,742	2,408,937
Printing	118,349	120,473	122,539	124,789	126,984
Wholesale trade	898,256	929,673	963,283	999,404	1,038,055
Retail - Motor vehicle and parts	248,496	258,097	267,826	277,694	287,711
Retail - Building material and garden supply	671,081	712,152	754,955	800,338	848,530
Retail - Gasoline stations	25,083	26,616	28,161	29,721	31,297
Retail - Clothing and clothing accessories	166,274	172,767	176,335	179,980	183,704
Retail - Miscellaneous	4,600	4,600	4,600	4,600	4,600
Air transportation	83,765	85,722	87,738	89,814	91,953
Truck transportation	53,353	54,581	55,913	57,357	58,923
Periodical publishers	16,608	16,670	16,754	16,840	16,928
Telecommunications	990,817	1,139,440	1,310,355	1,506,909	1,732,945
Commercial & industrial machinery & equipment rental & leasing	37,800	38,682	39,890	40,826	41,789
Legal services	3,019,125	3,085,672	3,152,410	3,219,347	3,286,487
Architectural, engineering, and related services	53,616	54,534	55,503	56,525	57,605
Management, scientific, and technical consulting services	3,028,751	3,095,463	3,162,375	3,229,495	3,296,829
Environmental and other technical consulting services	77,224	78,547	79,942	81,414	82,969
Advertising and related services	670,007	693,494	717,015	740,571	764,164
Photographic services	17,143	17,437	17,747	18,074	18,419
Employment services	48,695	50,156	51,661	53,211	54,807
Investigation and security services	29,990	30,504	31,046	31,617	32,221
Services to buildings and dwellings	233,086	237,078	241,289	245,733	250,426
Waste management and remediation services	1,406,435	1,486,911	1,440,354	1,522,828	1,478,405
Junior colleges, colleges, universities, and professional schools	95,481	98,345	101,296	104,335	107,465
Other educational services	442,246	454,753	467,603	480,805	494,370
Child day care services	61,969	66,427	71,189	76,280	81,725
Hotels and motels, including casino hotels	16,753	17,144	17,548	17,963	18,391
Food services and drinking places	50,259	51,433	52,643	53,889	55,172
Automotive repair and maintenance, except car washes	105,840	111,132	116,689	122,523	128,649
Commercial & industrial machinery & equipment	2,143,136	2,307,137	2,484,672	2,676,971	2,885,380
Grantmaking, giving, and social advocacy organizations	67,014	68,162	69,372	70,650	71,999
Civic, social, professional, and similar organizations	94,109	94,465	94,942	95,429	95,928
Postal service	61,969	66,427	71,189	76,280	81,725
Other federal government enterprises	20,104	20,449	20,812	21,195	21,600
Other state and local government enterprises	6,816,205	7,019,282	7,228,486	7,444,002	7,666,024
Labor Total	**36,217,664**	**37,829,159**	**39,259,676**	**40,525,042**	**42,332,411**
Total Expenditures	**80,057,911**	**84,020,305**	**87,859,289**	**91,871,800**	**96,533,443**

Operating Expenditures: Total Economic Impact

The economic impact results for the effect of the District's operating expenditures in Cuyahoga County are summarized in Table 18. Nearly 3,600 jobs will be created between 2012 and 2016. Labor income will increase by $359 million, total value added will increase by $487 million, and output will increase by $832.0 million.

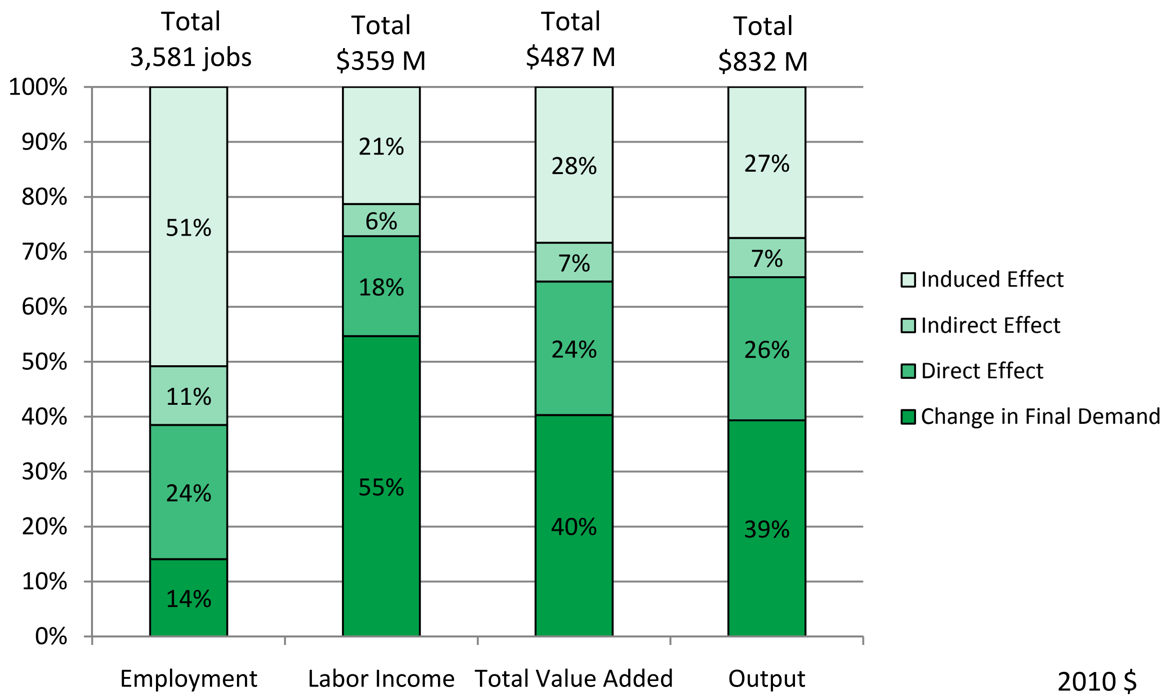
Table 18. Cuyahoga County – Economic Impact of Operating Expenditures, 2012-2016

Impact Type	Employment	Labor Income ($M)	Total Value Added ($M)	Output ($M)
Change in Final Demand	504	196.16	196.16	327.51
Direct Impact	874	65.22	118.28	216.86
Indirect Impact	383	21.04	34.45	59.30
Induced Impact	1,820	76.39	137.92	228.80
Total Impact	**3,581**	**358.81**	**486.81**	**832.47**

Figure 17 shows the economic impact by percentage of each impact: change in final demand, direct, indirect, and induced effects. In terms of employment, the largest share of the impact is due to the induced effect (50.8%, 1,820 employees). The majority of labor income (54.7%, $196.16 million) comes from the change in final demand (salaries of District employees). The same is true for value added and output where the majority of the impact stems from the change in final demand (40.3% and 39.3%, respectively). The indirect effect is the smallest in each of the impact measures. The indirect effect is small because less of the District's suppliers are located within Cuyahoga County.

The direct effect accounts for between 18.2% and 26.1% of the total impact. The indirect effect accounts for between 5.9% and 10.7% of the total. The induced effect accounts for between 21.3% and 50.8% of the total impact in Cuyahoga County.

Figure 17. Cuyahoga County – Impacts of Operating Expenditures: Direct, Indirect, and Induced Impacts as Percentage of Total Impact



EMPLOYMENT IMPACT[10]

The employment impact measures the number of jobs that will be created in Cuyahoga County between the years 2012 and 2016. The operation of the District in this period will create nearly 3,600 jobs.

The top ten industries with the highest total employment account for 40.9% of the total direct, indirect, and induced effects. The three largest industries in terms of total impact are: *Food services and drinking places* (218 jobs), *Real estate establishments* (159 jobs), and *Legal services* (133 jobs). In the *Food services and drinking places* and *Real estate establishments* industries, the majority of the impact is due to the induced effect, which represents the spending patterns of households. In *Legal Services,* the majority of the impact is due to the direct effect.

When the industries are aggregated into major sectors, *Health and social services* emerges as the largest sector with a total of 418 jobs created, mostly through the induced effect resulting from household spending. The *Professional-scientific and technical services* is the second highest sector in terms of employment with a total of 404 jobs. These, however, are due mostly to the direct effect. *Retail Trade* rounds out the top three with over 361 jobs created, 92% of which occur in the induced effect.

[10] See Appendix D for tables and figures related to the employment impact in Cuyahoga County.

Labor Income Impact[11]

The operation of the District will create an additional labor-income impact (household earnings) of $358.81 million in Cuyahoga County between 2012 and 2016. The largest industry that is affected is *Electric power generation, transmission, and distribution* with $11.27 million in direct, indirect, and induced impacts. The *Other state and local government enterprises* industry is the second highest industry with $10.98 in direct, indirect, and induced impacts. The third highest in terms of labor- income impact is *Management, scientific, and technical consulting services* with $10.42 million in direct, indirect, and induced impacts. In all three of these cases, the majority of the impact comes from the direct effect.

In terms of the direct, indirect, and induced labor-income effects on major sectors, the *Professional-scientific and technical services* sector has the largest impact with $29.39 million, followed by *Health and social services* ($20.12 million), and *Utilities* ($19.42 million). The impacts of *Professional-scientific and technical services* and *Utilities* are mostly in the direct effect. The impact of *Health and social services* is mostly in the induced effect.

Value-Added Impact[12]

The operation of the District between 2012 and 2016 will create a total value-added impact (comparable to Gross Domestic Product) in Cuyahoga County of $486.81 million. Of the top 10 industries, the *Electric power generation, transmission, and distribution* industry has the largest impact with $40.79 million in direct, indirect, and induced effects. The largest impact was in the direct effect. The second highest industry in terms of value-added impact is *Real estate establishments* with $19.01 and the third highest is *Imputed rental activity for owner-occupied dwellings* with $18.55 million. Both of these have large induced effects.

In terms of the major sectors, the *Utilities* sector is the largest in terms of value-added impact with $57.78 million in direct, indirect, and induced effects. This sector was ranked third in terms of labor income impact. The next highest sectors are: *Real estate and rental* ($38.94 million), *Professional-scientific and technical services* ($35.61 million), and *Health and social services* ($23.41 million).

Output Impact[13]

The total output impact of the District's operating expenditures in Cuyahoga County between 2012 and 2016 is $832.47 million. This means that an additional $832.47 million of goods and services will be produced in Cuyahoga County due to the operation of the District.

The top 10 industries affected represent almost 54% of the total direct, indirect, and induced impacts. The *Electric power generation, transmission, and distribution* industry has the highest impact in terms of direct, indirect, and induced effects with $55.21 million. This was also the highest

[11] See Appendix D for tables and figures related to the labor income impact in Cuyahoga County.

[12] See Appendix D for tables and figures related to the value-added impact in Cuyahoga County.

[13] See Appendix D for tables and figures related to the output impact in Cuyahoga County.

ranking industry in terms of labor income and output. The *Other state and local government enterprises* industry is ranked second with $37.75 million in direct, indirect, and induced output impact. Natural gas distribution is the third highest ranked industry with $37.61 million. All three of these impacts occur mostly in the direct effect.

In terms of major sectors, *Utilities* has the largest impact in the direct, indirect, and induced effects with $100.50 million. This sector was also the largest in terms of value-added impact. The *Professional-scientific and technical services* sector is the next highest sector with $57.87 million. *Real estate and rental* is the third highest with $54.51 million. The *Utilities* and *Professional-scientific and technical services* sectors have the bulk of their impact in the direct effect; while *Real estate and rental* has the majority of its impact through the induced effect.

TAX IMPACT[14]

The operation of the District between 2012 and 2016 will result in a total tax impact of $66.9 million. Just under half, $33.3 million, will go to state and local government and $33.6 million will go to the federal government.

[14] See Appendix D for tables and figures related to the tax impact in Cuyahoga County.

CONCLUDING COMMENTS

The Northeast Ohio Regional Sewer District works not only to improve water quality, but also serves as an economic engine for Northeast Ohio. Employing over 600 people, they make a significant impact through their operation alone. Beyond this, however, the District has a major capital improvements program that will continue through the next 30 years. It is estimated that the District will invest over $1.47 billion in Northeast Ohio of which $984 million will be invested in Cuyahoga County.

Because of this large investment, in the 5-year period between 2012 and 2016, the District will create a total of over 31,000 jobs in Northeast Ohio of which over 16,000 will be in Cuyahoga County. In Northeast Ohio, the District will create additional labor income of $1.63 billion, value added (GDP) of $2.20 billion, output of $4.64 billion, and over $443 million in taxes. In Cuyahoga County, through its operating and capital expenditures, the District will create additional labor income of $974 million, value added of $1.30 billion, output of $2.70 billion, and $236 million in taxes. A presentation to the District Board of Trustees was conducted in August, 2010; it is included in Appendix E.[15]

The District is an integral part of Northeast Ohio infrastructure. It also monitors and enforces industrial discharge limits, water quality sampling, and combined sewer overflow (CSO) monitoring and notification. The District assures clean water and a healthy environment by developing community partnerships, advocating for clean water on a national level, designing and constructing clean water projects, and providing high quality service to member communities. While working to fulfill their mission, the District is also working to enhance the quality of life for the residents of the region and thereby supporting the growth of Northeast Ohio.

[15] These totals include the employment of the District.

APPENDIX A: ECONOMIC IMPACT OF CAPITAL EXPENDITURES IN THE 4-COUNTY REGION

CUYAHOGA, SUMMIT, LAKE & LORAIN COUNTIES

Table A-1. 4-County Region – Capital Expenditures (in Dollars), 2012-2016

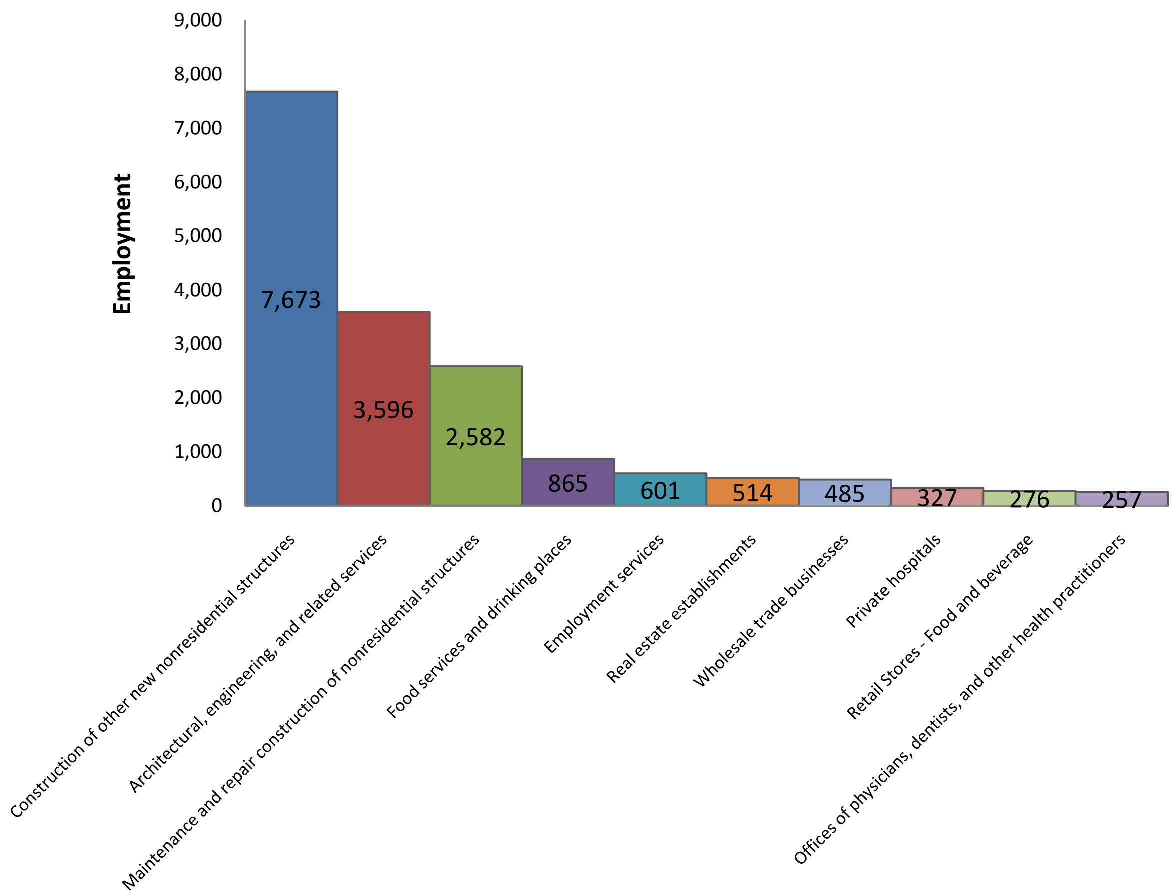
Industry Description	2012	2013	2014	2015	2016
Materials Total	**94,196,651**	**86,483,012**	**49,848,810**	**50,603,366**	**77,629,490**
Electric power generation, transmission, and distribution	10,389	7,916	1,004	0	0
Construction of other new nonresidential structures	48,671,920	35,740,679	5,725,093	7,820,931	23,717,939
Maintenance & repair construction of nonresidential structures	8,791,329	9,934,059	15,477,237	18,048,684	5,945,771
Asphalt paving mixture and block mfg	170,916	130,222	16,523	0	569
Asphalt shingle and coating materials mfg	421,583	228,980	139,614	336,392	483,565
Other plastics product mfg	846,443	347,565	149,981	138,956	4,683,808
Ready-mix concrete mfg	5,828,733	11,479,872	4,511,766	1,235,708	8,705,440
Concrete pipe, brick, and block mfg	657,883	535,455	181,651	50,177	394,129
Lime and gypsum product mfg	305,415	66,751	34,446	30,247	58,756
Steel product mfg from purchased steel	1,778,246	1,710,708	4,119,687	1,175,984	1,230,862
Aluminum product mfg from purchased aluminum	0	0	0	25,093	10,594
Ornamental and architectural metal products mfg	313,630	128,386	82,867	52,550	122,758
Fabricated pipe and pipe fitting mfg	3,780,077	3,087,792	5,145,932	14,300,228	3,902,276
Construction machinery mfg	7,280,601	12,850,539	3,230,687	1,676,818	3,523,677
Air purification and ventilation equipment mfg	58,200	0	0	0	0
Air conditioning, refrigeration, & warm air heating equipment mfg	0	20,250	0	40,511	17,104
Pump and pumping equipment mfg	35,000	0	0	734,162	2,042,472
Material handling equipment mfg	10,068,294	7,341,409	8,763,178	3,594,833	16,844,810
Computer terminals & other computer peripheral equipment mfg	27,900	27,900	0	0	0
Industrial process variable instruments mfg	296,442	223,028	49,183	151,678	699,206
Totalizing fluid meters and counting devices mfg	100,000	0	0	0	0
Analytical laboratory instrument mfg	16,880	22,500	11,880	0	0
Power, distribution, and specialty transformer mfg	25,000	0	0	0	0
Switchgear and switchboard apparatus mfg	2,532,167	1,317,903	388,238	253,221	1,649,004
Relay and industrial control mfg	43,200	43,200	0	0	0
Communication and energy wire and cable mfg	3,600	3,600	-	-	-
Custom architectural woodwork and millwork mfg	94,382	52,885	40,639	51,120	322,621
Showcase, partition, shelving, and locker mfg	240,563	118,891	89,515	97,701	205,043
Retail Stores - Motor vehicle and parts	819,000	93,000	281,000	0	0
Software publishers	21,600	0	0	0	0
Securities, commodity contracts, investments & related activities	324,635	339,192	621,932	433,803	1,834,688
Insurance carriers	597,066	603,242	783,323	351,518	1,215,954
Waste management and remediation services	35,556	27,090	3,437	3,051	18,444
Labor Total	**133,683,907**	**144,649,313**	**76,091,548**	**56,241,528**	**94,156,465**
Total Expenditure	**227,880,557**	**231,132,325**	**125,940,358**	**106,844,894**	**171,785,955**

Table A-2. 4-County Region – Economic Impact of Capital Expenditures, 2012-2016 (Impact in 2010 Dollars)

Impact Type	Employment	Labor Income ($M)	Total Value Added ($M)	Output ($M)
Direct Impact	13,146	559.04	608.34	1,878.63
Indirect Impact	5,355	296.71	435.01	783.54
Induced Impact	5,437	217.23	393.90	662.88
Total Impact	**23,938**	**1,072.99**	**1,437.25**	**3,325.04**

Figure A-1. 4-County Region – Impacts of Capital Projects: Direct, Indirect, and Induced Impacts as Percentage of Total Impact

Figure A-2. 4-County Region – Top 10 Industries with the Highest Total Employment from Capital Expenditures

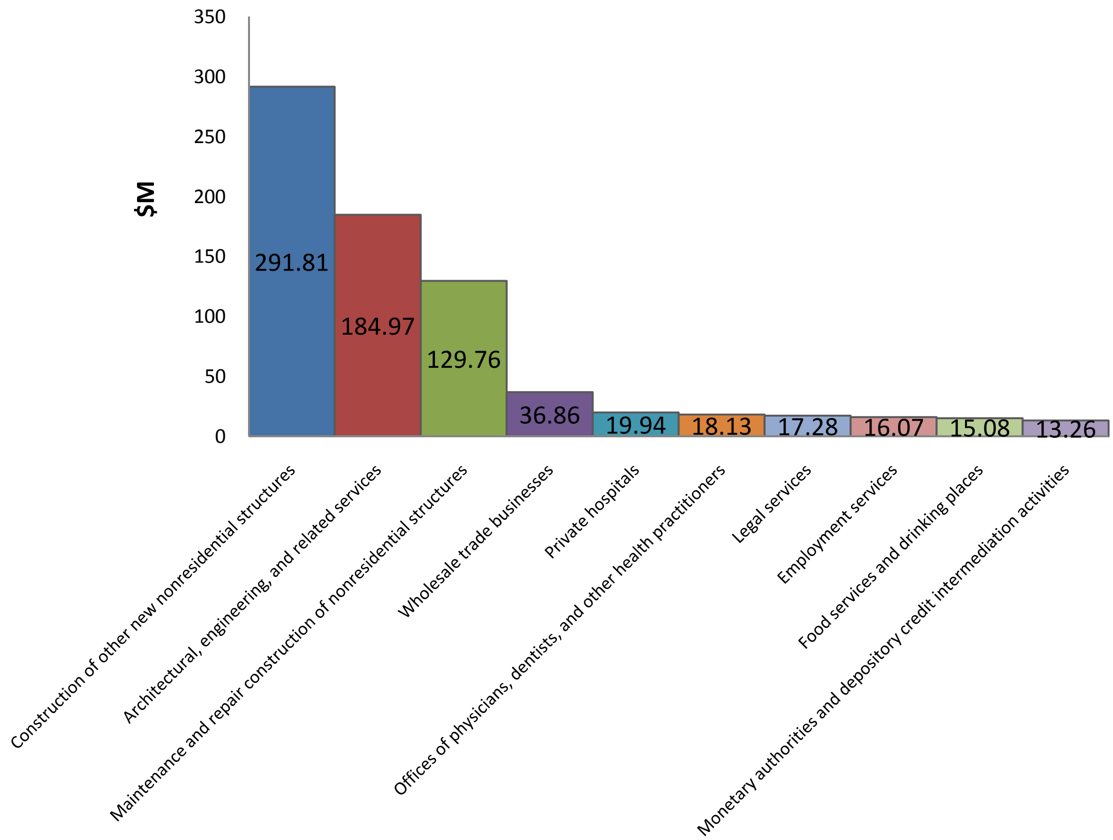


Industry Description	Direct	Indirect	Induced	Total
Construction of other new nonresidential structures	7,673	0	0	7,673
Architectural, engineering, and related services	2,507	1,071	18	3,596
Maintenance and repair construction of nonresidential structures	2,531	37	15	2,582
Food services and drinking places	0	289	576	865
Employment services	0	482	119	601
Real estate establishments	0	205	309	514
Wholesale trade businesses	0	305	180	485
Private hospitals	0	0	327	327
Retail Stores - Food and beverage	0	75	202	276
Offices of physicians, dentists, and other health practitioners	0	0	257	257
Total Top 10	12,710	2,463	2,004	17,177
Total Industry	13,146	5,355	5,437	23,938
Percentage of 10 Industries	96.68%	45.99%	36.85%	71.75%

Table A-3. 4-County Region – Employment Impact from Capital Expenditures by Major Economic Sectors

Industry Description	Direct	Indirect	Induced	Total
Agriculture, forestry, fish & hunting	0	12	6	18
Mining	0	38	3	41
Utilities	0	17	19	36
Construction	10,203	38	38	10,280
Manufacturing	390	291	51	733
Wholesale trade	0	305	180	485
Retail trade	3	477	1,090	1,570
Transportation & warehousing	0	235	105	340
Information	1	111	85	197
Finance & insurance	29	234	369	632
Real estate & rental	0	291	334	625
Professional- scientific & tech services	2,511	1,701	243	4,454
Management of companies	0	90	29	119
Administrative & waste services	10	844	264	1,118
Educational services	0	4	228	232
Health & social services	0	0	1,155	1,155
Arts- entertainment & recreation	0	36	137	173
Accommodation & food services	0	291	578	869
Other services	0	292	465	757
Government & non NAICs	0	49	56	105
Total	**13,146**	**5,355**	**5,437**	**23,938**

Figure A-3. 4-County Region – Top 10 Industries with the Highest Total Labor Income Impact from Capital Expenditures (in Millions of 2010 Dollars)

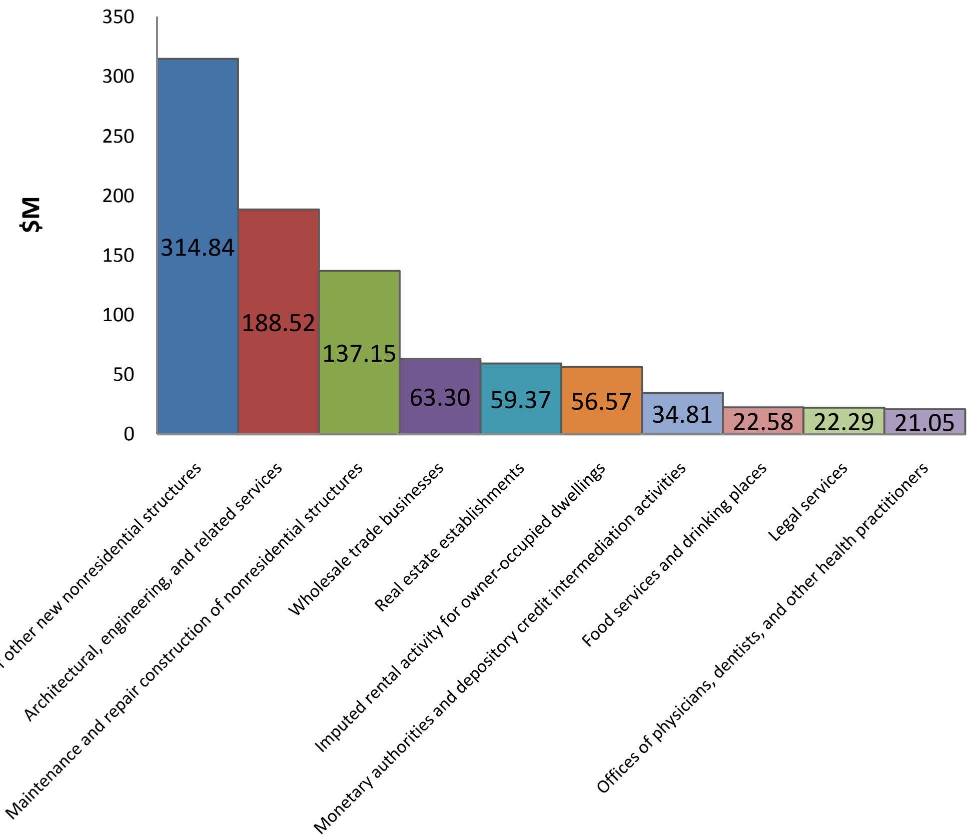


Industry Description	Direct	Indirect	Induced	Total
Construction of other new nonresidential structures	291.81	0	0	291.81
Architectural, engineering, and related services	109.56	74.15	1.26	184.97
Maintenance and repair construction of nonresidential structures	126.73	2.13	0.89	129.76
Wholesale trade businesses	0	23.18	13.68	36.86
Private hospitals	0	0	19.94	19.94
Offices of physicians, dentists, and other health practitioners	0	0	18.13	18.13
Legal services	0	11.50	5.77	17.28
Employment services	0	12.89	3.19	16.07
Food services and drinking places	0	5.04	10.03	15.08
Monetary authorities & depository credit intermediation activities	0	7.30	5.97	13.26
Total Top 10	528.10	136.19	78.87	743.17
Total Industry	559.04	296.71	217.23	1,072.99
Percentage of 10 Industries	94.47%	45.90%	36.31%	69.26%

Table A-4. 4 County Region – Labor Income Impact from Capital Expenditures by Major Economic Sector (in Millions of 2010 Dollars)

Description	Direct	Indirect	Induced	Total
Agriculture, forestry, fish & hunting	0	0.30	0.13	0.44
Mining	0	2.95	0.27	3.23
Utilities	0	2.15	2.42	4.56
Construction	418.54	2.18	1.82	422.54
Manufacturing	28.07	25.90	3.44	57.42
Wholesale Trade	0	23.18	13.68	36.86
Retail trade	0.12	13.69	30.64	44.45
Transportation & warehousing	0	12.15	5.36	17.51
Information	0.04	7.34	5.15	12.53
Finance & insurance	2.00	17.23	26.29	45.51
Real estate & rental	0.00	10.98	8.62	19.60
Professional-scientific & tech svcs	109.76	119.17	16.12	245.06
Management of companies	0	9.38	3.02	12.39
Administrative & waste services	0.50	27.34	8.54	36.38
Educational services	0	0.14	6.24	6.39
Health & social services	0	0.00	54.95	54.96
Arts- entertainment & recreation	0	0.99	3.58	4.57
Accommodation & food services	0	5.10	10.11	15.20
Other services	0	12.71	12.37	25.08
Government & non NAICs	0	3.85	4.48	8.32
Total	**559.04**	**296.71**	**217.23**	**1,072.99**

Figure A-4. 4-County Region – Top 10 Industries with the Highest Total Value-Added Impact from Capital Expenditures (in Millions of 2010 Dollars)

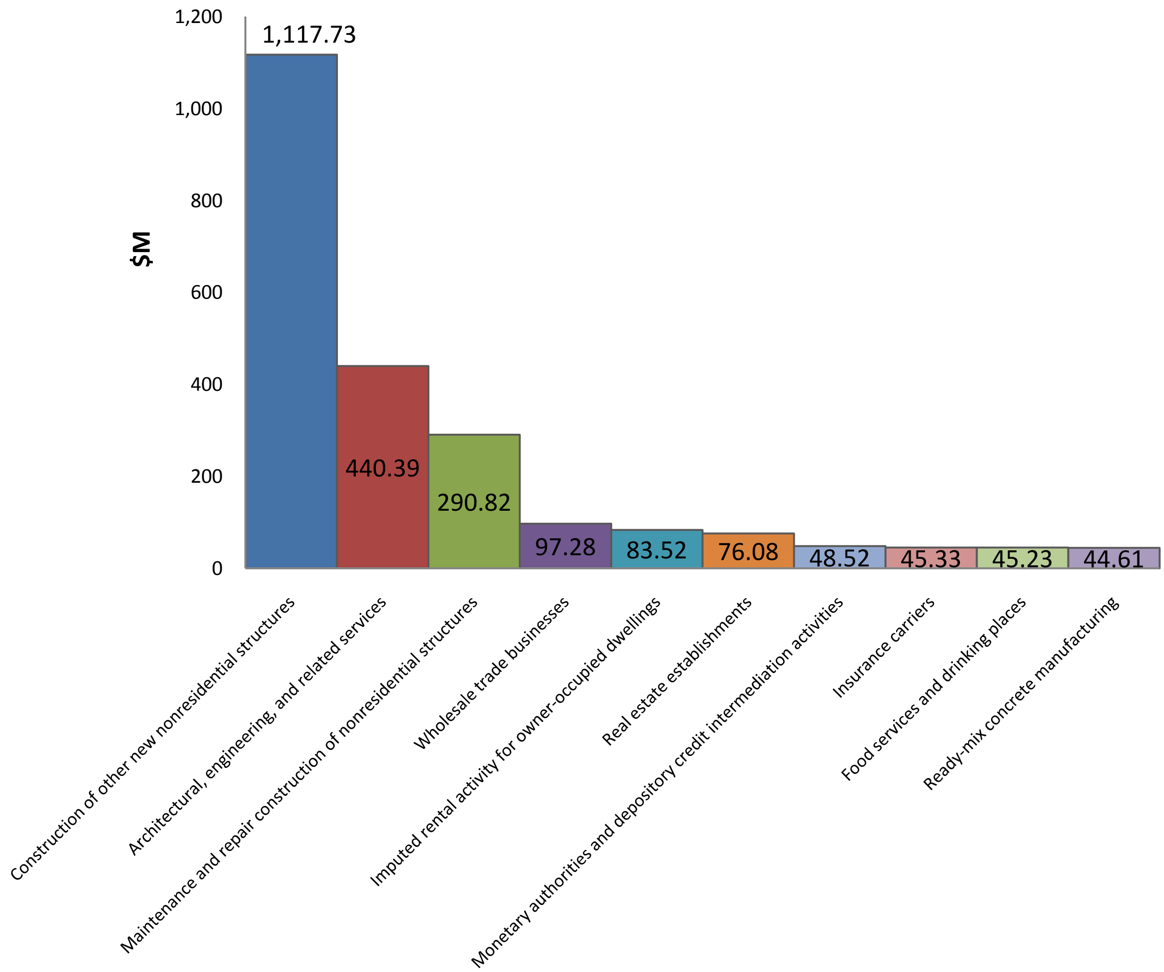


Industry Description	Direct	Indirect	Induced	Total
Construction of other new nonresidential structures	314.84	0	0	314.84
Architectural, engineering, and related services	112.03	75.21	1.28	188.52
Maintenance and repair construction of nonresidential structures	133.97	2.24	0.93	137.15
Wholesale trade businesses	0	39.80	23.50	63.30
Real estate establishments	0	23.68	35.70	59.37
Imputed rental activity for owner-occupied dwellings	0	0	56.57	56.57
Monetary authorities & depository credit intermediation activities	0	19.15	15.66	34.81
Food services and drinking places	0	7.55	15.03	22.58
Legal services	0	14.84	7.45	22.29
Offices of physicians, dentists, and other health practitioners	0	0	21.05	21.05
Total Top 10	560.85	182.47	177.17	920.49
Total Industry	608.34	435.01	393.90	1,437.25
Percentage of 10 Industries	92.19%	41.95%	44.98%	64.05%

Table A-5. 4-County Region– Value Added Impact from Capital Expenditures by Major Economic Sector (in Millions of 2010 Dollars)

Industry Description	Direct	Indirect	Induced	Total
Agriculture, forestry, fish & hunting	0	0.54	0.23	0.77
Mining	0	5.89	0.71	6.60
Utilities	0.01	7.08	8.03	15.13
Construction	448.82	2.30	2.35	453.47
Manufacturing	43.48	40.17	5.52	89.17
Wholesale Trade	0	39.80	23.50	63.30
Retail trade	0.16	22.46	50.43	73.05
Transportation & warehousing	0	17.16	7.49	24.65
Information	0.08	16.66	11.19	27.93
Finance & insurance	2.67	33.18	44.27	80.12
Real estate & rental	0	35.87	94.32	130.19
Professional- scientific & tech svcs	112.28	134.22	19.81	266.31
Management of companies	0	12.59	4.05	16.65
Administrative & waste services	0.84	34.20	10.86	45.91
Educational services	0	0.16	6.83	6.99
Health & social services	0	0.01	63.98	63.99
Arts- entertainment & recreation	0	1.23	5.11	6.34
Accommodation & food services	0	7.65	15.15	22.80
Other services	0	19.92	15.08	34.99
Government & non NAICs	0	3.91	4.98	8.89
Total	**608.34**	**435.01**	**393.90**	**1,437.25**

Figure A-5. 4-County Region – Top 10 Industries with the Highest Total Output Impact from Capital Expenditures (in Millions of 2010 Dollars)

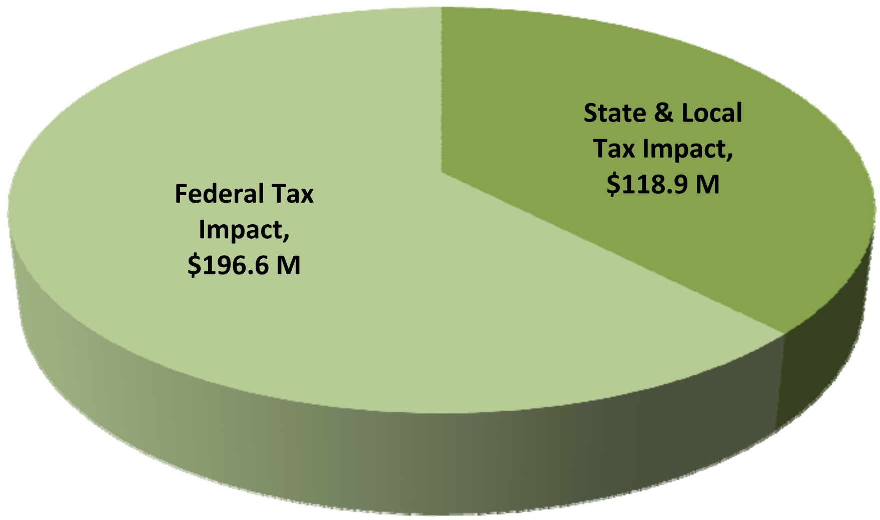


Industry Description	Direct	Indirect	Induced	Total
Construction of other new nonresidential structures	1,117.73	0	0	1,117.73
Architectural, engineering, and related services	307.02	131.13	2.23	440.39
Maintenance and repair construction of nonresidential structures	284.97	4.13	1.72	290.82
Wholesale trade businesses	0	61.17	36.11	97.28
Imputed rental activity for owner-occupied dwellings	0	0	83.52	83.52
Real estate establishments	0	30.34	45.74	76.08
Monetary authorities and depository credit intermediation activities	0	26.69	21.82	48.52
Insurance carriers	3.12	12.67	29.54	45.33
Food services and drinking places	0	15.13	30.10	45.23
Ready-mix concrete manufacturing	28.89	15.56	0.15	44.61
Total Top 10	1,741.74	296.82	250.95	2,289.51
Total Industry	1,878.63	783.54	662.88	3,325.04
Percentage of 10 Industries	92.71%	37.88%	37.86%	68.86%

Table A-6. 4-County Region – Output Impact from Capital Expenditures by Major Economic Sector (in Millions of 2010 Dollars)

Industry Description	Direct	Indirect	Induced	Total
Agriculture, forestry, fish & hunting	0	1.7	0.5	2.2
Mining	0	9.6	1.2	10.8
Utilities	0	11.8	12.4	24.2
Construction	1,402.7	4.2	3.9	1,410.9
Manufacturing	159.7	120.4	21.6	301.7
Wholesale Trade	0	61.2	36.1	97.3
Retail trade	0.2	32.8	74.4	107.4
Transportation & warehousing	0	30.5	13.5	44.0
Information	0.2	42.4	29.1	71.6
Finance & insurance	6.3	56.0	87.6	149.9
Real estate & rental	0	58.3	133.3	191.6
Professional- scientific & tech svcs	307.6	225.7	32.2	565.5
Management of companies	0	20.4	6.5	26.9
Administrative & waste services	1.9	50.6	16.8	69.3
Educational svcs	0	0.3	12.0	12.3
Health & social services	0	0.0	103.4	103.4
Arts- entertainment & recreation	0	2.2	10.6	12.8
Accommodation & food services	0	15.3	30.3	45.6
Other services	0	33.2	26.9	60.1
Government & non NAICs	0	6.9	10.5	17.4
Total	**1,878.6**	**783.5**	**662.9**	**3,325.0**

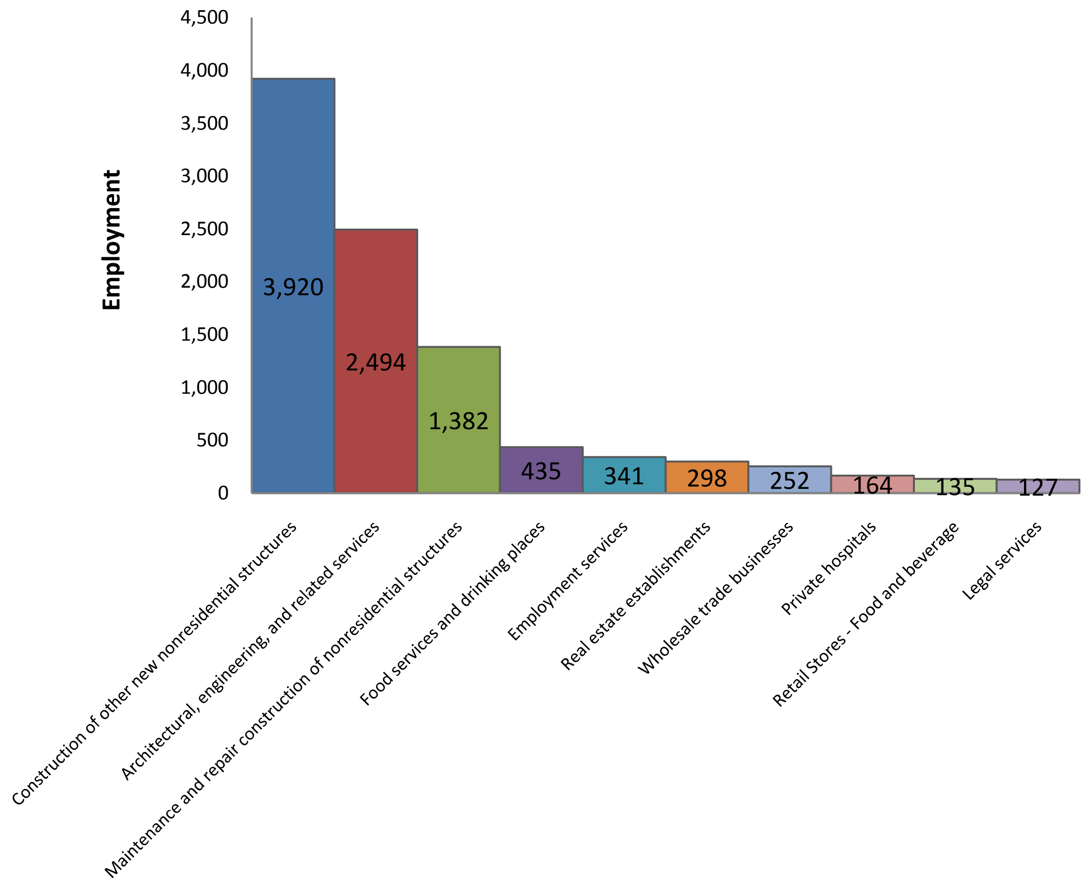
Figure A-6. 4- County Region – Tax Impact of Capital Expenditures, 2012-2016



Total Tax Impact: $315.5M

APPENDIX B: ECONOMIC IMPACT OF CAPITAL EXPENDITURES IN CUYAHOGA COUNTY

Figure B-1. Cuyahoga County – Top 10 Industries with the Highest Total Employment from Capital Expenditures

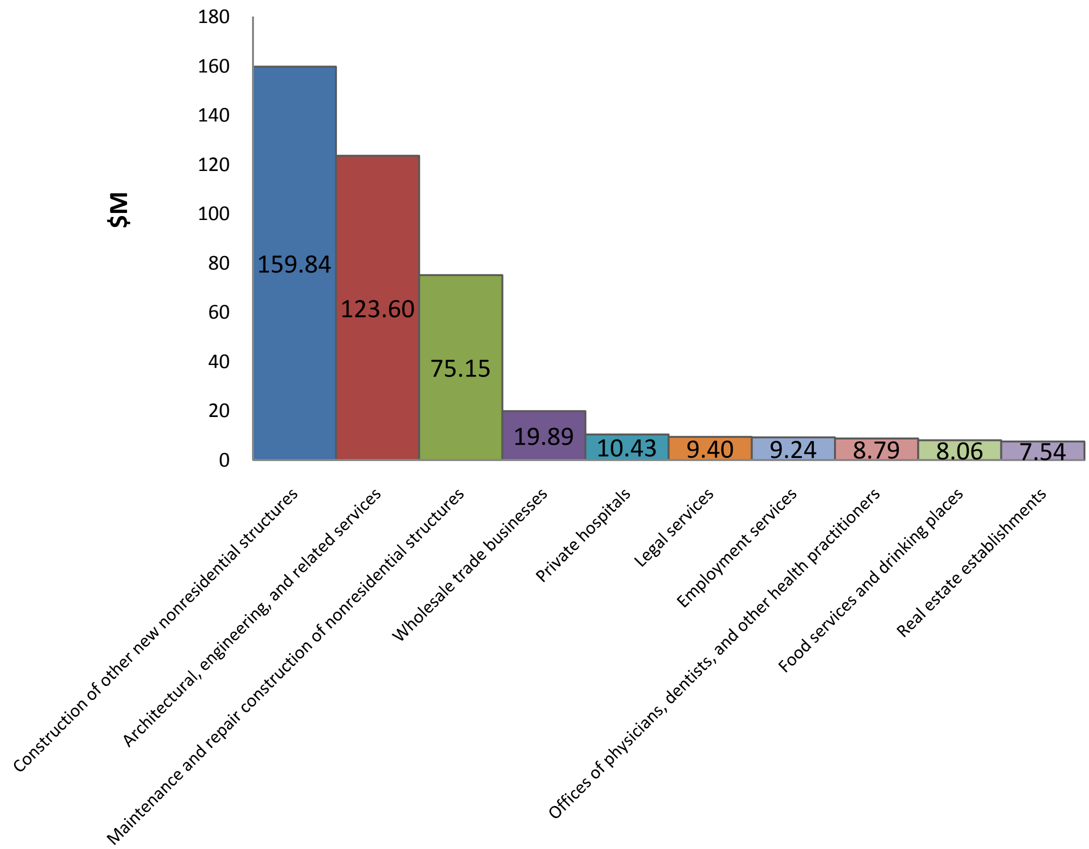


Industry Description	Direct	Indirect	Induced	Total
Construction of other new nonresidential structures	3,920	0	0	3,920
Architectural, engineering, and related services	1,904	581	9	2,494
Maintenance and repair construction of nonresidential structures	1,355	20	7	1,382
Food services and drinking places	0	172	263	435
Employment services	0	286	55	341
Real estate establishments	0	133	165	298
Wholesale trade businesses	0	167	85	252
Private hospitals	0	0	164	164
Retail Stores - Food and beverage	0	38	97	135
Legal services	0	88	39	127
Total Top 10	7,180	1,485	882	9,547
Total Industry	7,479	2,966	2,579	13,024
Percentage of 10 Industries	96.00%	50.07%	34.21%	73.31%

Table B-1. Cuyahoga County – Employment Impact from Capital Expenditures by Major Economic Sectors

Industry Description	Direct	Indirect	Induced	Total
Agriculture, forestry, fish & hunting	0	0	1	1
Mining	0	9	0	9
Utilities	0	5	6	11
Construction	5,276	21	17	5,314
Manufacturing	267	145	22	434
Wholesale Trade	0	167	85	252
Retail trade	1	223	485	709
Transportation & warehousing	0	133	51	184
Information	0	66	41	107
Finance & insurance	21	135	175	330
Real estate & rental	0	182	176	359
Professional- scientific & tech services	1,907	973	118	2,999
Management of companies	0	51	13	64
Administrative & waste services	6	487	120	613
Educational services	0	3	126	129
Health & social services	0	0	568	568
Arts- entertainment & recreation	0	22	69	91
Accommodation & food services	0	173	264	437
Other services	0	141	215	356
Government & non NAICs	0	29	28	57
Total	**7,479**	**2,966**	**2,579**	**13,024**

Figure B-2. Cuyahoga County – Top 10 Industries with the Highest Total Labor Income Impact from Capital Expenditures (in Millions of 2010 Dollars)

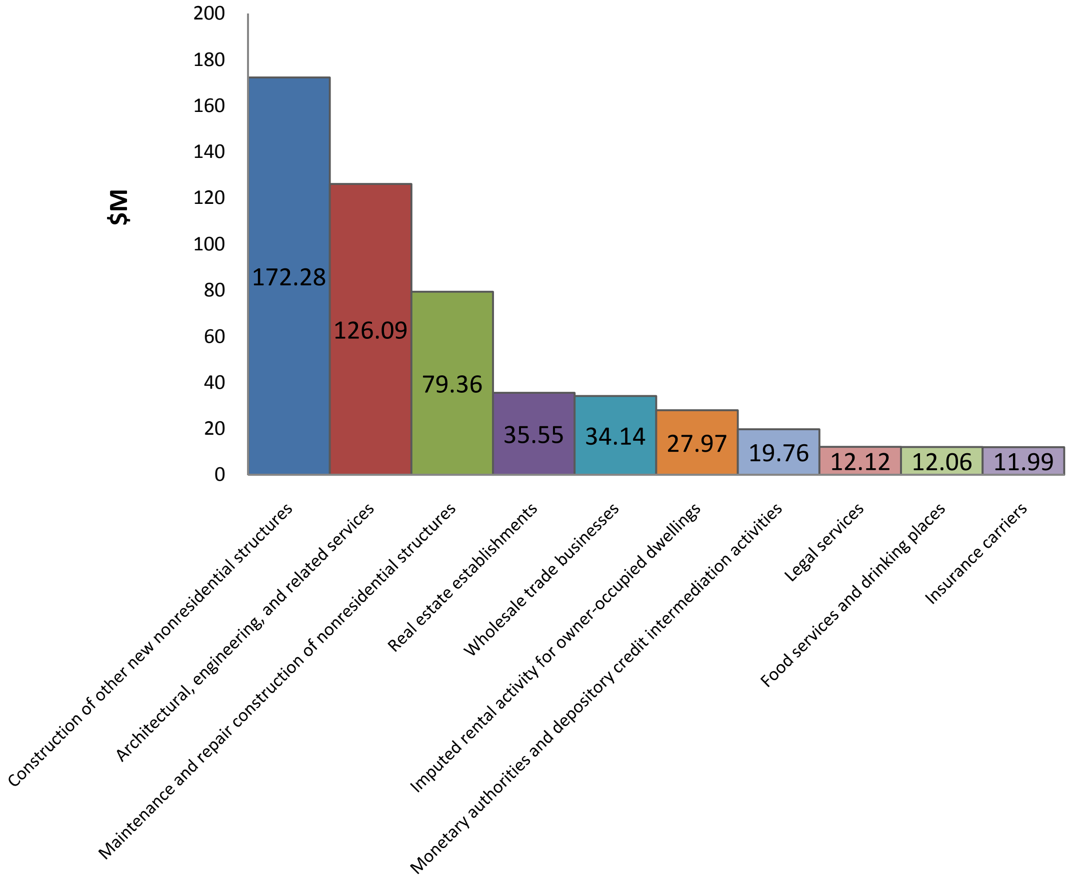


Industry Description	Direct	Indirect	Induced	Total
Construction of other new nonresidential structures	159.84	0	0	159.84
Architectural, engineering, and related services	82.17	40.80	0.63	123.60
Maintenance and repair construction of nonresidential structures	73.48	1.25	0.42	75.15
Wholesale trade businesses	0	13.17	6.72	19.89
Private hospitals	0	0	10.43	10.43
Legal services	0	6.52	2.88	9.40
Employment services	0	7.77	1.48	9.24
Offices of physicians, dentists, and other health practitioners	0	0	8.79	8.79
Food services and drinking places	0	3.19	4.87	8.06
Real estate establishments	0	3.37	4.17	7.54
Total Top 10	315.49	76.08	40.38	431.95
Total Industry	337.99	169.91	107.42	615.32
Percentage of 10 Industries	93.34%	44.78%	37.59%	70.20%

Table B-2. Cuyahoga County – Labor Income Impact from Capital Expenditures by Major Economic Sector (in Millions of 2010 Dollars)

Description	Direct	Indirect	Induced	Total
Agriculture, forestry, fish & hunting	0	0	0.01	0.01
Mining	0	0.46	0.04	0.50
Utilities	0	0.64	0.67	1.32
Construction	233.32	1.28	0.85	235.46
Manufacturing	20.21	14.09	1.46	35.76
Wholesale Trade	0	13.17	6.72	19.89
Retail trade	0.06	6.66	14.12	20.85
Transportation & warehousing	0	6.51	2.52	9.03
Information	0.02	4.89	2.80	7.70
Finance & insurance	1.72	10.84	13.63	26.18
Real estate & rental	0.00	6.84	4.69	11.52
Professional- scientific & tech svcs	82.34	69.38	8.02	159.74
Management of companies	0	5.50	1.37	6.87
Administrative & waste services	0.31	16.46	4.02	20.79
Educational services	0	0.10	3.50	3.59
Health & social services	0	0	27.70	27.71
Arts- entertainment & recreation	0	0.66	1.98	2.64
Accommodation & food services	0	3.22	4.90	8.13
Other services	0	6.86	6.12	12.98
Government & non NAICs	0	2.36	2.29	4.65
Total	**337.99**	**169.91**	**107.42**	**615.32**

Figure B-3. Cuyahoga County – Top 10 Industries with the Highest Total Value-Added Impact from Capital Expenditures (in Millions of 2010 Dollars)

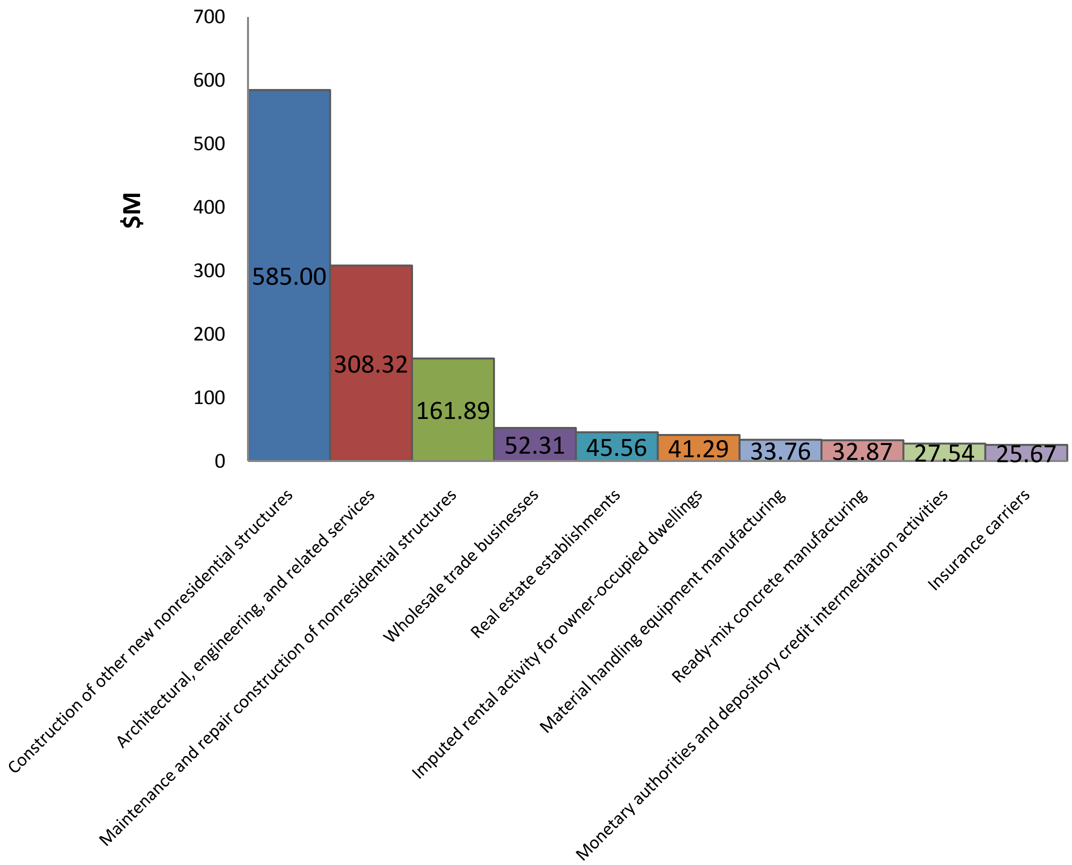


Industry Description	Direct	Indirect	Induced	Total
Construction of other new nonresidential structures	172.28	0	0	172.28
Architectural, engineering, and related services	84.07	41.38	0.64	126.09
Maintenance and repair construction of nonresidential structures	77.60	1.32	0.44	79.36
Real estate establishments	0	15.89	19.66	35.55
Wholesale trade businesses	0	22.61	11.53	34.14
Imputed rental activity for owner-occupied dwellings	0	0	27.97	27.97
Monetary authorities & depository credit intermediation activities	0	11.65	8.11	19.76
Legal services	0	8.40	3.71	12.12
Food services and drinking places	0	4.77	7.29	12.06
Insurance carriers	1.16	3.91	6.91	11.99
Total Top 10	335.12	109.94	86.25	531.31
Total Industry	367.65	250.04	194.97	812.66
Percentage of 10 Industries	91.15%	43.97%	44.24%	65.38%

Table B-3. Cuyahoga County – Value-Added Impact from Capital Expenditures by Major Economic Sector (in Millions of 2010 Dollars)

Industry Description	Direct	Indirect	Induced	Total
Agriculture, forestry, fish & hunting	0	0	0.01	0.01
Mining	0	0.90	0.09	0.99
Utilities	0.01	2.02	2.09	4.13
Construction	249.88	1.36	1.10	252.34
Manufacturing	30.56	21.72	2.34	54.62
Wholesale trade	0	22.61	11.53	34.14
Retail trade	0.08	11.11	23.57	34.76
Transportation & warehousing	0	9.26	3.52	12.78
Information	0.04	11.03	6.08	17.15
Finance & insurance	2.27	20.80	22.96	46.03
Real estate & rental	0	23.19	48.68	71.87
Professional- scientific & tech svcs	84.28	79.23	9.88	173.39
Management of companies	0	7.37	1.84	9.20
Administrative & waste services	0.52	20.65	5.12	26.29
Educational services	0	0.11	3.82	3.93
Health & social services	0	0	32.21	32.21
Arts- entertainment & recreation	0	0.82	2.86	3.68
Accommodation & food services	0	4.83	7.35	12.18
Other services	0	10.66	7.35	18.01
Government & non NAICs	0	2.38	2.56	4.94
Total	**367.65**	**250.04**	**194.97**	**812.66**

Figure B-4. Cuyahoga County – Top 10 Industries with the Highest Total Output Impact from Capital Expenditures (in Millions of 2010 Dollars)

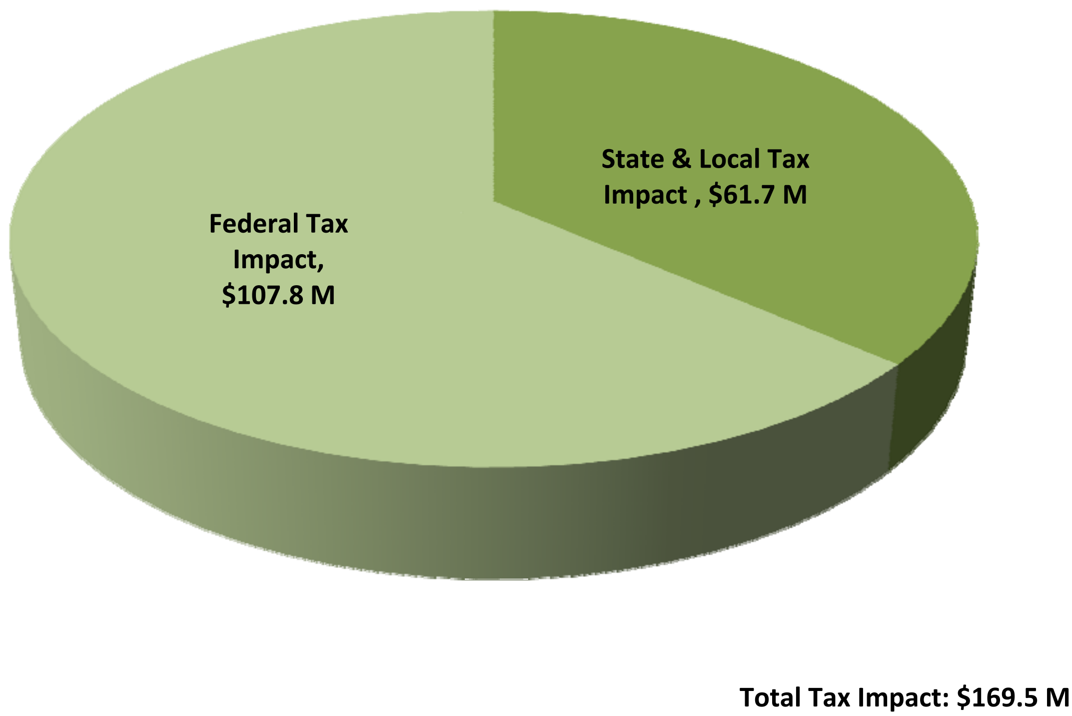


Industry Description	Direct	Indirect	Induced	Total
Construction of other new nonresidential structures	585.00	0	0	585.00
Architectural, engineering, and related services	235.41	71.80	1.11	308.32
Maintenance and repair construction of nonresidential structures	158.73	2.37	0.79	161.89
Wholesale trade businesses	0	34.64	17.67	52.31
Real estate establishments	0	20.37	25.19	45.56
Imputed rental activity for owner-occupied dwellings	0	0	41.29	41.29
Material handling equipment manufacturing	33.60	0.16	0.00	33.76
Ready-mix concrete manufacturing	23.12	9.67	0.08	32.87
Monetary authorities and depository credit intermediation activities	0	16.24	11.30	27.54
Insurance carriers	2.49	8.38	14.79	25.67
Total Top 10	1038.36	163.62	112.22	1314.20
Total Industry	1100.98	442.73	323.80	1867.51
Percentage of 10 Industries	94.31%	36.96%	34.66%	70.37%

Table B-4. Cuyahoga County – Output Impact from Capital Expenditures by Major Economic Sector (in Millions of 2010 Dollars)

Industry Description	Direct	Indirect	Induced	Total
Agriculture, forestry, fish & hunting	0	0	0.02	0.02
Mining	0	1.57	0.16	1.73
Utilities	0.02	3.37	3.21	6.60
Construction	743.73	2.44	1.83	748.00
Manufacturing	114.90	62.64	8.96	186.51
Wholesale trade	0	34.64	17.67	52.31
Retail trade	0.11	16.24	34.76	51.11
Transportation & warehousing	0	16.61	6.45	23.05
Information	0.09	26.52	14.86	41.48
Finance & insurance	5.02	34.49	44.00	83.51
Real estate & rental	0	36.83	68.55	105.38
Professional- scientific & tech svcs	235.91	132.78	16.01	384.69
Management of companies	0	11.82	2.95	14.77
Administrative & waste services	1.20	30.18	7.87	39.24
Educational svcs	0	0.20	6.76	6.96
Health & social services	0	0.01	51.76	51.77
Arts- entertainment & recreation	0	1.42	5.76	7.18
Accommodation & food services	0	9.42	14.34	23.76
Other services	0	17.51	12.70	30.21
Government & non NAICs	0	4.04	5.18	9.21
Total	**1,100.98**	**442.73**	**323.80**	**1,867.51**

Figure B-5. Cuyahoga County – Tax Impact of Capital Expenditures, 2012-2016



APPENDIX C: ECONOMIC IMPACT OF OPERATING EXPENDITURES IN THE 4-COUNTY REGION

CUYAHOGA, SUMMIT, LAKE & LORAIN COUNTIES

Table C-1. 4-County Region – Operating Expenditures (in Dollars), 2012-2016

Industry Description	2012	2013	2014	2015	2016
Materials Total	**48,775,401**	**51,363,356**	**53,909,576**	**56,824,157**	**59,828,106**
Electric power generation, transmission, and distribution	11,458,701	11,802,462	12,156,536	12,521,232	12,896,869
Natural gas distribution	6,664,179	7,530,523	8,509,491	9,615,724	10,865,769
Water, sewage and other systems	1,392,311	1,531,542	1,684,696	1,853,166	2,038,482
Construction of other new nonresidential structures	794,133	807,736	822,082	837,223	853,213
Maintenance & repair construction of nonresidential	3,096,036	3,293,281	3,432,240	3,573,701	3,717,836
Printing	118,349	120,473	122,539	124,789	126,984
Wholesale trade	1,030,243	1,070,057	1,112,621	1,158,359	1,207,287
Retail - Motor vehicle and parts	295,089	306,490	318,043	329,761	341,657
Retail - Building material and garden supply	714,769	757,927	802,787	850,327	900,782
Retail - Gasoline stations	29,787	31,606	33,442	35,294	37,165
Retail - Clothing and clothing accessories	168,675	175,168	178,735	182,380	186,105
Air transportation	86,704	88,730	90,816	92,966	95,179
Truck transportation	53,353	54,581	55,913	57,357	58,923
Periodical publishers	16,608	16,670	16,754	16,840	16,928
Telecommunications	990,817	1,139,440	1,310,355	1,506,909	1,732,945
Commercial & industrial machinery & equipment rental & leasing	56,699	58,022	59,835	61,239	62,684
Legal services	4,025,500	4,114,229	4,203,214	4,292,462	4,381,982
Architectural, engineering, and related services	86,639	88,297	89,866	91,521	93,269
Management, scientific, and technical consulting services	4,040,972	4,129,966	4,219,230	4,308,774	4,398,605
Environmental and other technical consulting services	117,868	122,000	124,167	126,454	128,869
Advertising and related services	745,238	771,740	797,896	824,092	850,330
Photographic services	20,358	21,360	21,740	22,140	22,563
Employment services	54,106	55,729	57,401	59,123	60,897
Investigation and security services	35,613	37,367	38,031	38,731	39,471
Services to buildings and dwellings	315,109	326,174	331,968	338,082	344,539
Waste management and remediation services	1,699,443	1,797,504	1,742,967	1,841,706	1,789,809
Junior colleges, colleges, universities, and professional schools	106,090	109,273	112,551	115,927	119,405
Other educational services	553,458	569,166	585,305	601,888	618,927
Child day care services	61,969	66,427	71,189	76,280	81,725
Hotels and motels, including casino hotels	17,341	17,746	18,163	18,593	19,036
Food services and drinking places	52,022	53,238	54,490	55,779	57,108
Automotive repair and maintenance, except car washes	125,685	131,969	138,568	145,496	152,771
Commercial & industrial machinery & equipment	2,562,740	2,759,472	2,970,645	3,199,370	3,447,247
Grantmaking, giving, and social advocacy organizations	115,092	119,765	121,892	124,137	126,508
Civic, social, professional, and similar organizations	94,109	94,465	94,942	95,429	95,928
Postal service	61,969	66,427	71,189	76,280	81,725
Other federal government enterprises	34,528	35,929	36,568	37,241	37,952
Other state and local government enterprises	6,873,898	7,081,206	7,291,509	7,508,186	7,731,434
Labor Total	**42,249,640**	**44,124,655**	**45,790,409**	**47,265,073**	**49,368,057**
Total Expenditure	**91,025,041**	**95,488,011**	**99,699,985**	**104,089,230**	**109,196,163**

Table C-2. 4-County Region – Economic Impact of Capital Expenditures, 2012-2016 (Impact in 2010 Dollars)

Impact Type	Employment	Labor Income ($M)	Total Value Added ($M)	Output ($M)
Change in Final Demand	584	228.80	228.80	327.51
Direct Impact	1,081	75.01	129.63	241.08
Indirect Impact	490	26.08	43.44	75.75
Induced Impact	2,406	96.80	174.65	293.73
Total Impact	**4,562**	**426.68**	**576.51**	**938.07**

Figure C-1. 4-County Region – Impacts of Operating Expenditures: Direct, Indirect, and Induced Impacts as Percentage of Total Impact

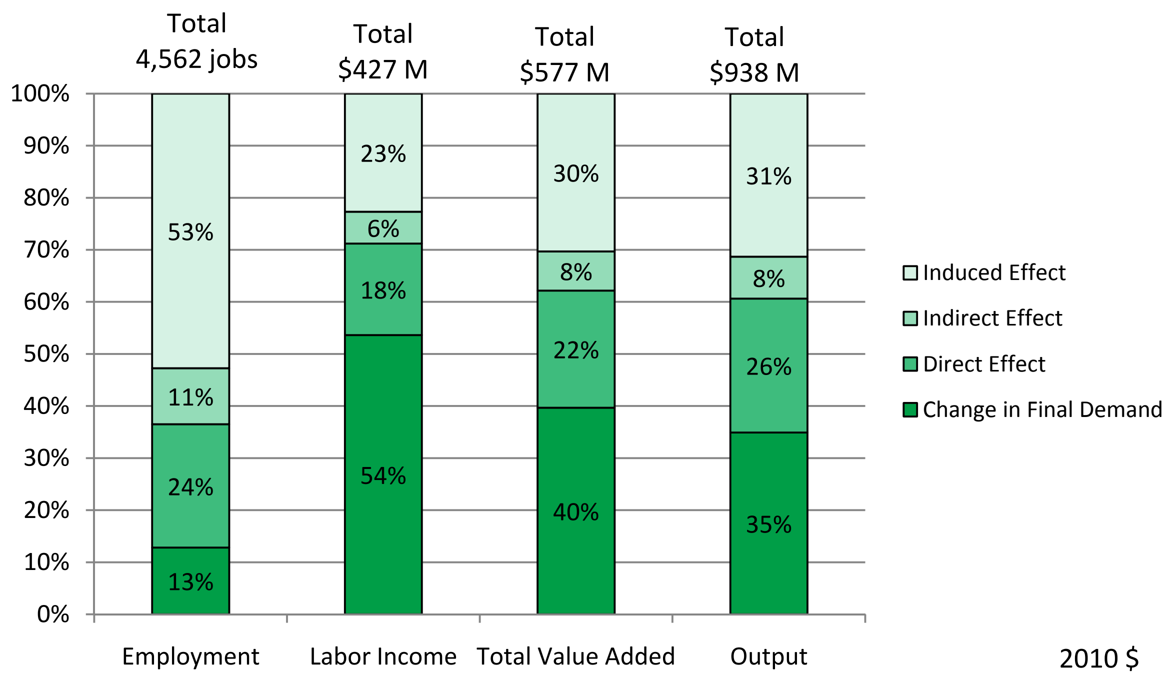
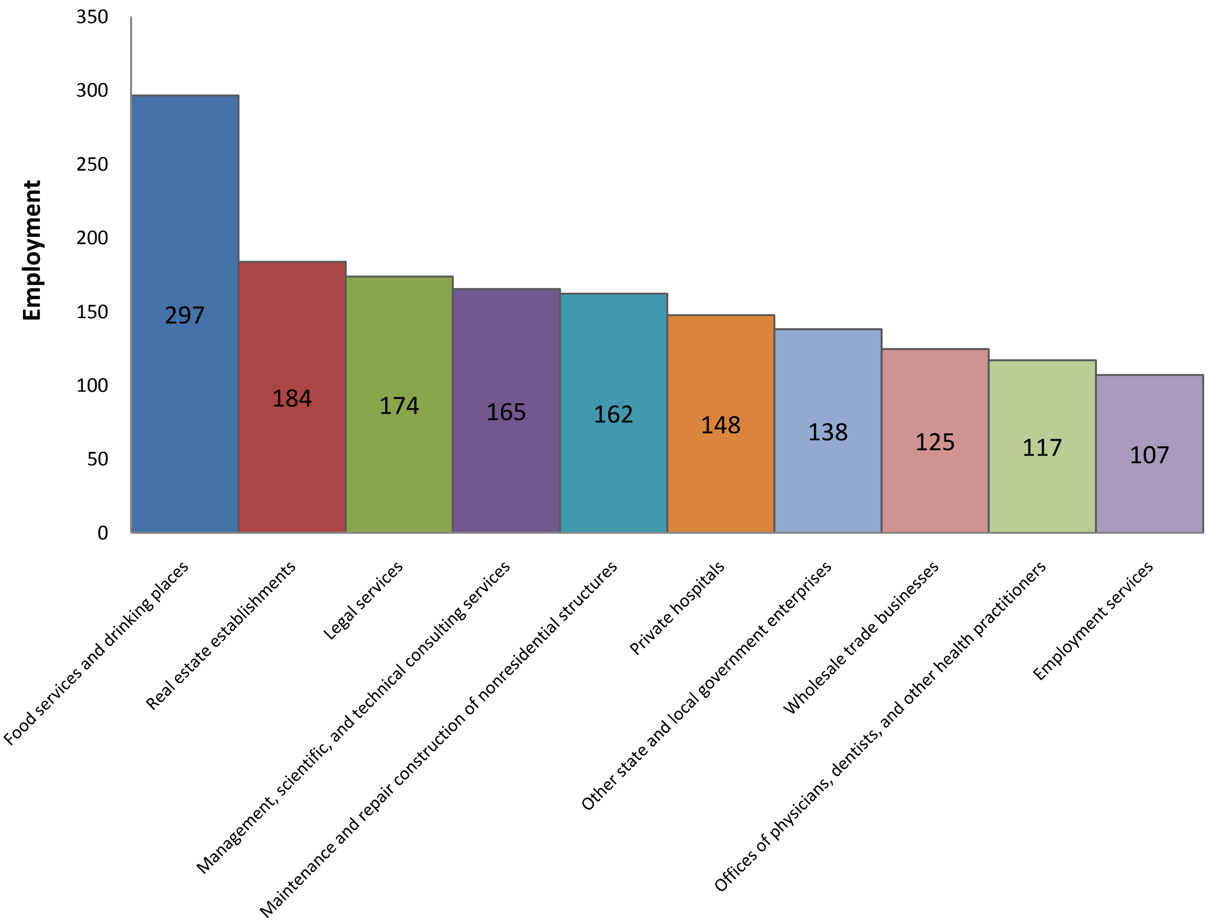


Figure C-2. 4-County Region – Top 10 Industries with the Highest Total Employment from Operating Expenditures



Industry Description	Direct	Indirect	Induced	Total
Food services and drinking places	5	35	256	297
Real estate establishments	0	39	145	184
Legal services	125	14	35	174
Management, scientific, and technical consulting services	143	10	12	165
Maintenance and repair construction of nonresidential structures	130	25	7	162
Private hospitals	0	0	148	148
Other state and local government enterprises	121	5	12	138
Wholesale trade businesses	26	14	85	125
Offices of physicians, dentists, and other health practitioners	0	0	117	117
Employment services	8	46	53	107
Total Top 10	558	189	870	1,617
Total Industry	1,081	490	2,406	3,978
Percentage of 10 Industries	51.60%	38.57%	36.15%	40.64%

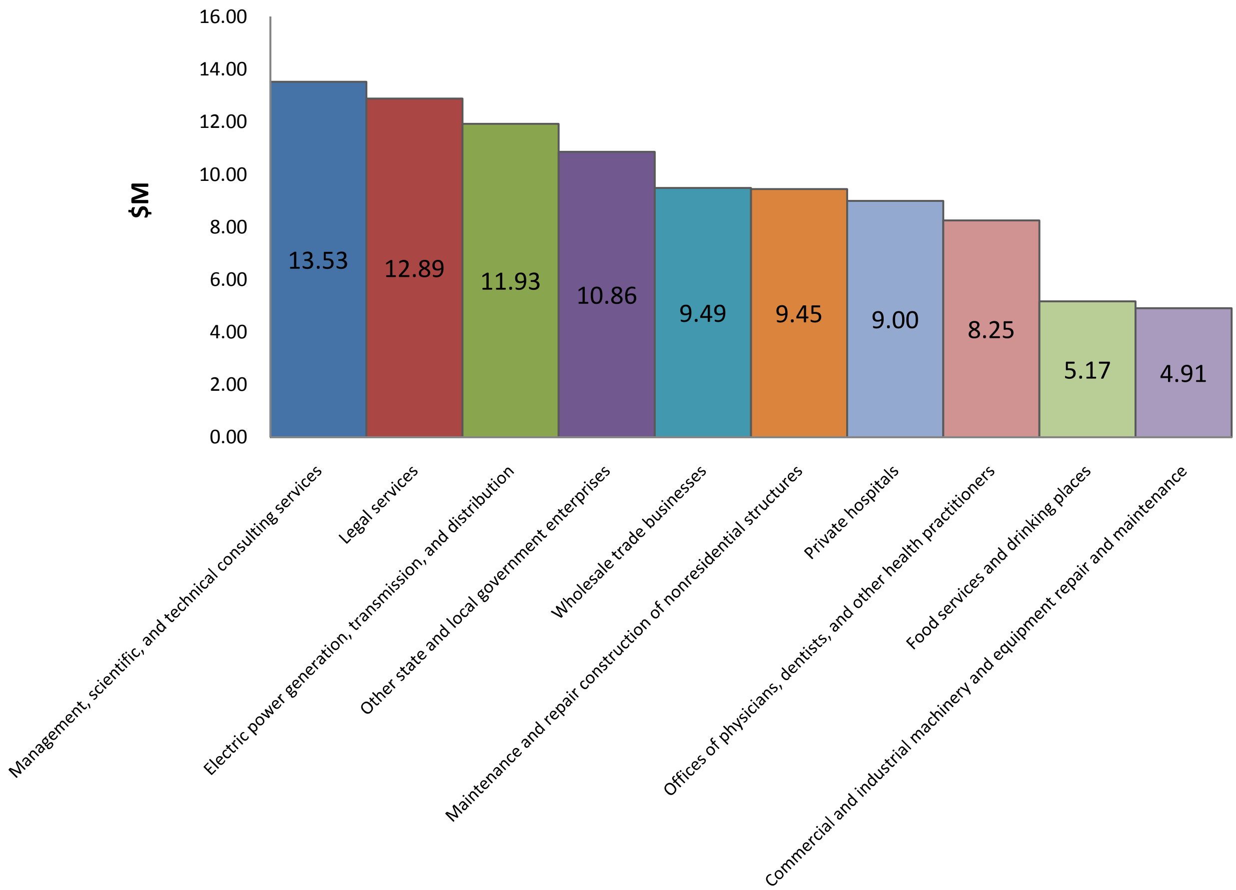
* These numbers represent only the top 10 industries in terms of direct, indirect, and induced impacts

Table C-3. 4-County Region – Employment Impact from Operating Expenditures by Major Economic Sectors

Industry Description	Direct	Indirect	Induced	Total
Agriculture, forestry, fish & hunting	0	0	3	3
Mining	0	21	1	22
Utilities	156	2	9	167
Construction	154	29	17	200
Manufacturing	3	11	23	38
Wholesale trade	26	14	85	125
Retail trade	24	13	468	505
Transportation & warehousing	3	25	46	75
Information	13	19	38	70
Finance & insurance	0	34	162	196
Real estate & rental	1	43	156	200
Professional- scientific & tech services	311	103	109	522
Management of companies	0	8	13	21
Administrative & waste services	81	96	117	294
Educational services	56	1	93	151
Health & social services	8	0	522	530
Arts- entertainment & recreation	0	6	60	66
Accommodation & food services	6	35	257	299
Other services	111	17	201	329
Government & non NAICs	128	11	25	164
Total	**1,081**	**490**	**2,406**	**3,978**
Change in final demand*	584			
Direct impact	1,081			
Indirect impact	490			
Induced impact	2,406			
Total employment impact	**4,562**			

* For employment impact, the change in final demand equals the number of full-time equivalent employees working for the District.

Figure C-3. 4-County Region – Top 10 Industries with the Highest Total Labor Income Impact from Operating Expenditures (in Millions of 2010 Dollars)



Industry Description	Direct	Indirect	Induced	Total
Management, scientific, and technical consulting services	11.72	0.85	0.96	13.53
Legal services	9.27	1.02	2.60	12.89
Electric power generation, transmission, and distribution	10.85	0.18	0.90	11.93
Other state and local government enterprises	9.53	0.38	0.96	10.86
Wholesale trade businesses	1.94	1.10	6.44	9.49
Maintenance and repair construction of nonresidential structures	7.58	1.47	0.40	9.45
Private hospitals	0.00	0.00	9.00	9.00
Offices of physicians, dentists, and other health practitioners	0.00	0.00	8.25	8.25
Food services and drinking places	0.09	0.61	4.47	5.17
Commercial &industrial machinery &equipment repair & maintenance	4.57	0.16	0.18	4.91
Total Top 10	55.55	5.78	34.16	95.48
Total Industry	75.01	26.08	96.80	197.88
Percentage of 10 Industries	74.05%	22.15%	35.29%	48.25%

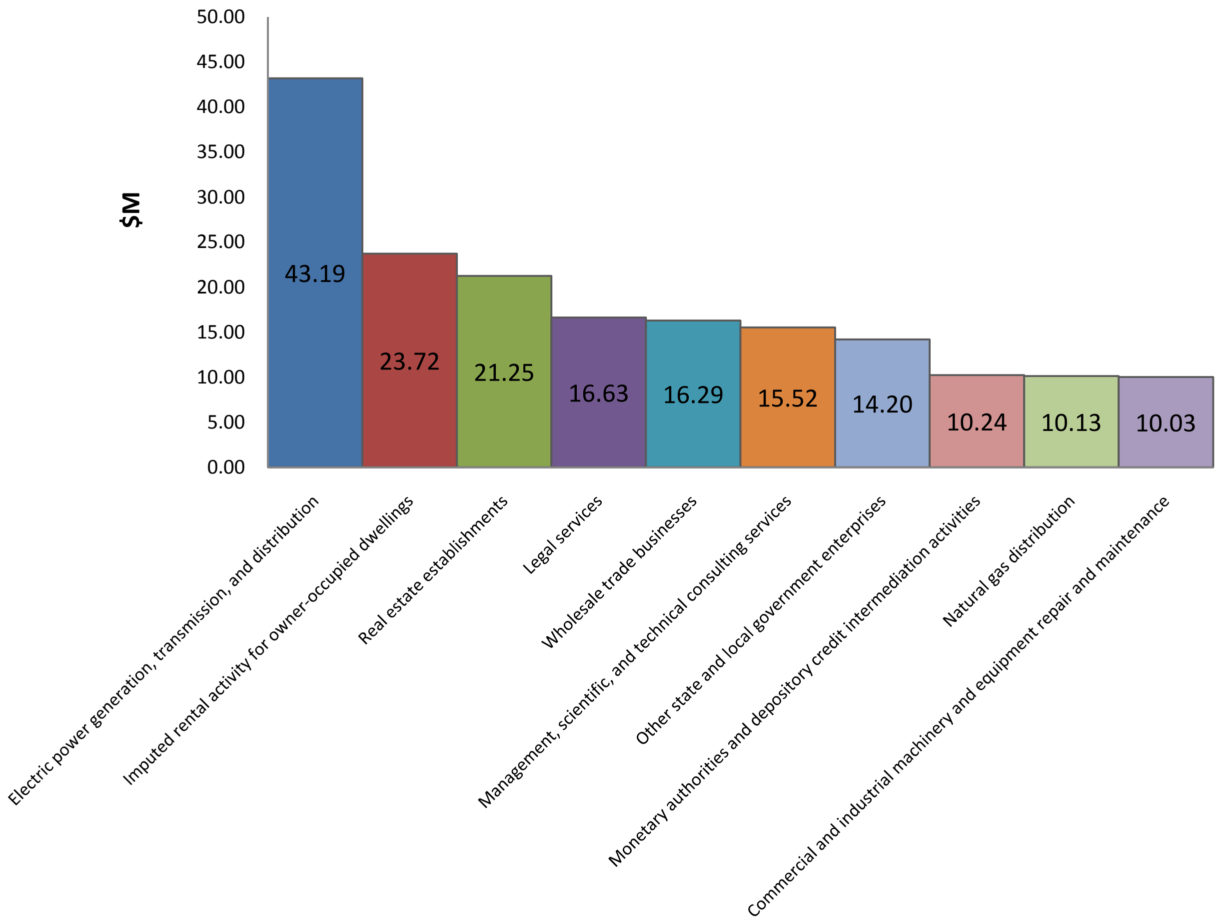
* These numbers represent only the top10industries in terms of direct, indirect, and induced impacts

Table C-4. 4-County Region – Labor Income Impact from Operating Expenditures by Major Economic Sectors (in Millions of 2010 Dollars)

Industry Description	Direct	Indirect	Induced	Total
Agriculture, forestry, fish & hunting	0.00	0.01	0.06	0.07
Mining	0.00	1.86	0.12	1.99
Utilities	18.11	0.29	1.11	19.51
Construction	8.81	1.62	0.80	11.23
Manufacturing	0.18	0.91	1.55	2.64
Wholesale trade	1.94	1.10	6.44	9.49
Retail trade	0.80	0.37	13.16	14.33
Transportation & warehousing	0.23	1.30	2.35	3.88
Information	0.97	1.20	2.31	4.47
Finance & insurance	0.00	2.48	11.55	14.03
Real estate & rental	0.06	1.20	4.01	5.27
Professional- scientific & tech services	23.06	7.12	7.22	37.39
Management of companies	0.00	0.86	1.36	2.22
Administrative & waste services	3.46	3.36	3.80	10.62
Educational services	1.42	0.03	2.56	4.02
Health & social services	0.13	0.00	24.84	24.97
Arts- entertainment & recreation	0.00	0.15	1.58	1.73
Accommodation & food services	0.12	0.62	4.50	5.24
Other services	5.65	0.68	5.47	11.80
Government & non NAICs	10.08	0.90	2.00	12.98
Total	**75.01**	**26.08**	**96.80**	**197.88**
Change in final demand*	228.80			
Direct impact	75.01			
Indirect impact	26.08			
Induced impact	96.80			
Total labor income impact	**426.68**			

* For labor-income impact, the change in final demand equals the payroll of employees working for the District.

Figure C-4. 4-County Region – Top 10 Industries with the Highest Total Value-Added Impact from Operating Expenditures (in Millions of 2010 Dollars)



Industry Description	Direct	Indirect	Induced	Total
Electric power generation, transmission, and distribution	39.28	0.65	3.26	43.19
Imputed rental activity for owner-occupied dwellings	0.00	0.00	23.72	23.72
Real estate establishments	0.00	4.51	16.75	21.25
Legal services	11.96	1.32	3.35	16.63
Wholesale trade businesses	3.34	1.89	11.06	16.29
Management, scientific, and technical consulting services	13.44	0.98	1.10	15.52
Other state and local government enterprises	12.45	0.49	1.25	14.20
Monetary authorities and depository credit intermediation activities	0.00	3.14	7.10	10.24
Natural gas distribution	9.68	0.18	0.27	10.13
Commercial & industrial machinery & equipment repair & maintenance	9.32	0.33	0.37	10.03
Total Top 10	99.48	13.48	68.24	181.19
Total Industry	129.63	43.44	174.65	347.71
Percentage of 10 Industries	76.74%	31.03%	39.07%	52.11%

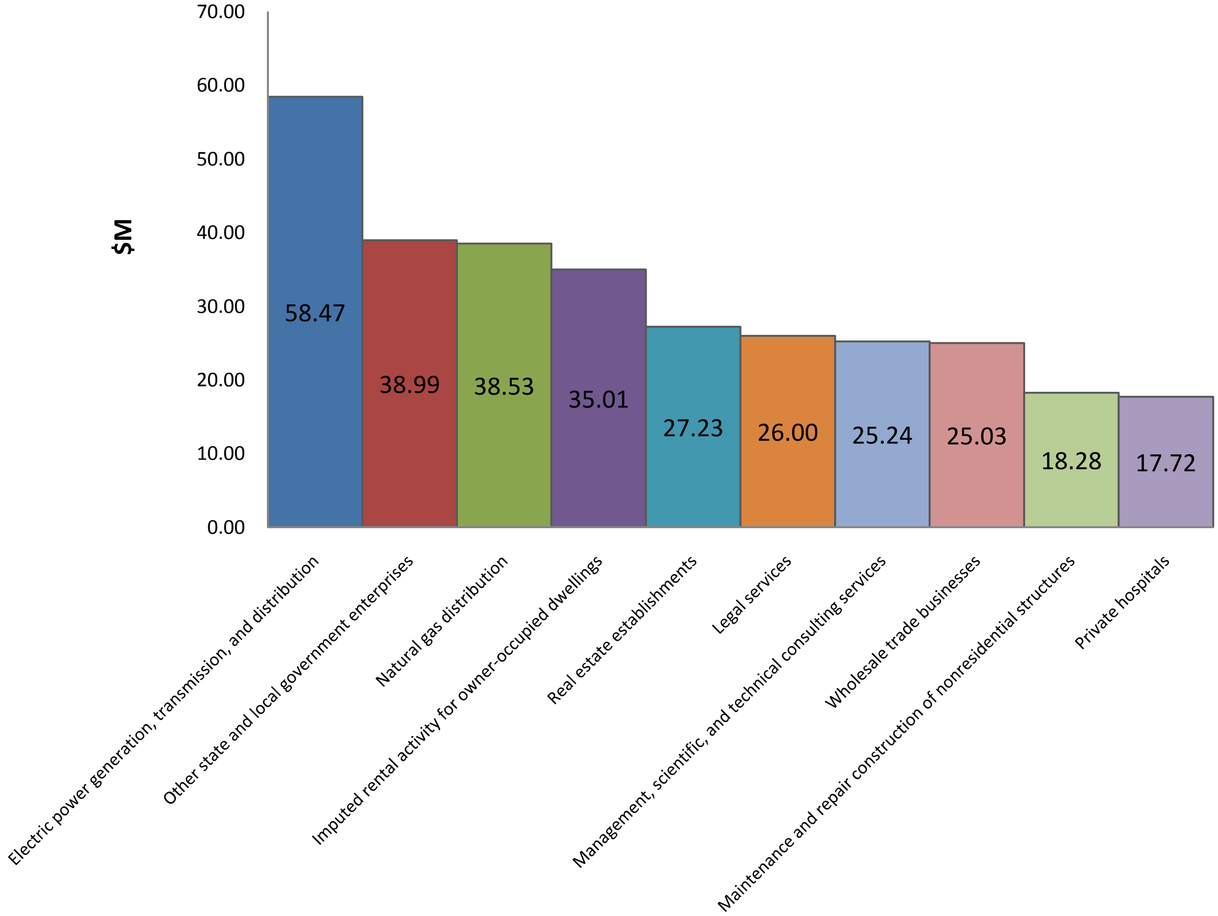
* These numbers represent only the top10 industries in terms of direct, indirect, and induced impacts

Table C-5. 4-County Region – Value-Added Impact from Operating Expenditures by Major Economic Sectors (in Millions of 2010 Dollars)

Industry Description	Direct	Indirect	Induced	Total
Agriculture, forestry, fish & hunting	0.00	0.01	0.10	0.12
Mining	0.00	4.97	0.32	5.29
Utilities	54.27	0.89	3.69	58.85
Construction	9.26	1.73	1.02	12.01
Manufacturing	0.24	1.38	2.50	4.13
Wholesale trade	3.34	1.89	11.06	16.29
Retail trade	1.29	0.61	21.67	23.57
Transportation & warehousing	0.31	1.93	3.29	5.52
Information	2.59	2.66	5.03	10.28
Finance & insurance	0.00	4.92	19.54	24.46
Real estate & rental	0.11	5.24	41.36	46.71
Professional- scientific & tech services	27.87	8.51	8.87	45.24
Management of companies	0.00	1.16	1.82	2.98
Administrative & waste services	5.14	4.42	4.84	14.40
Educational services	1.72	0.04	2.82	4.57
Health & social services	0.22	0.00	28.86	29.08
Arts- entertainment & recreation	0.00	0.19	2.25	2.44
Accommodation & food services	0.19	0.93	6.75	7.87
Other services	10.11	0.98	6.63	17.72
Government & non NAICs	12.98	0.98	2.23	16.19
Total	**129.63**	**43.44**	**174.65**	**347.71**
Change in final demand*	228.80			
Direct impact	129.63			
Indirect impact	43.44			
Induced impact	174.65			
Total value added impact	**576.51**			

* For value added impact, the change in final demand equals the total District expenditures in Northeast Ohio.

Figure C-5. 4-County Region – Top 10 Industries with the Highest Total Output Impact from Operating Expenditures (in Millions of 2010 Dollars)



Industry Description	Direct	Indirect	Induced	Total
Electric power generation, transmission, and distribution	53.17	0.88	4.42	58.47
Other state and local government enterprises	34.20	1.36	3.43	38.99
Natural gas distribution	36.82	0.67	1.04	38.53
Imputed rental activity for owner-occupied dwellings	0.00	0.00	35.01	35.01
Real estate establishments	0.00	5.77	21.46	27.23
Legal services	18.70	2.07	5.24	26.00
Management, scientific, and technical consulting services	21.86	1.59	1.79	25.24
Wholesale trade businesses	5.13	2.90	17.00	25.03
Maintenance and repair construction of nonresidential structures	14.66	2.84	0.78	18.28
Private hospitals	0.00	0.00	17.72	17.72
Total Top 10	184.54	18.07	107.90	310.51
Total Industry	241.08	75.75	293.73	610.56
Percentage of 10 Industries	76.55%	23.86%	36.73%	50.86%

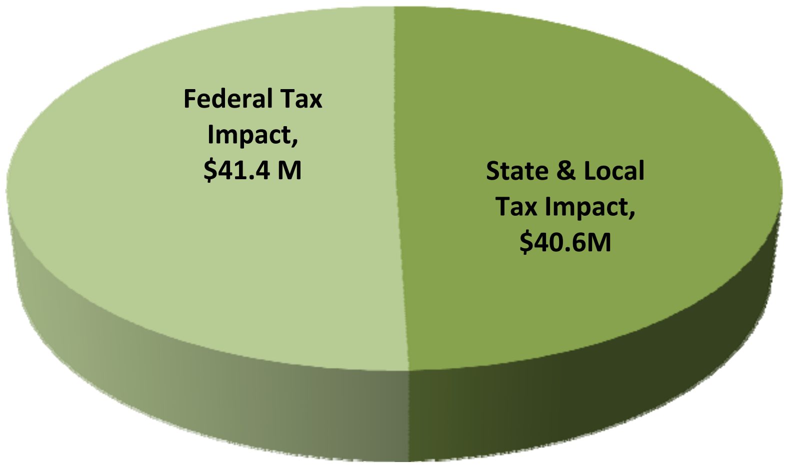
* These numbers represent only the top 10 industries in terms of direct, indirect, and induced impacts

Table C-6. 4-County Region – Output Impact from Operating Expenditures by Major Economic Sectors (in Millions of 2010 Dollars)

Industry Description	Direct	Indirect	Induced	Total
Agriculture, forestry, fish & hunting	0.00	0.04	0.23	0.27
Mining	0.00	8.41	0.55	8.95
Utilities	97.36	1.63	5.67	104.67
Construction	18.15	3.30	1.72	23.16
Manufacturing	0.55	4.10	9.82	14.47
Wholesale trade	5.13	2.90	17.00	25.03
Retail trade	1.93	0.90	31.96	34.78
Transportation & warehousing	0.71	3.44	5.91	10.06
Information	6.22	7.02	13.05	26.29
Finance & insurance	0.00	8.16	38.35	46.50
Real estate & rental	0.27	7.23	58.25	65.74
Professional- scientific & tech services	45.40	13.91	14.40	73.71
Management of companies	0.00	1.87	2.94	4.82
Administrative & waste services	10.51	6.89	7.49	24.89
Educational services	3.42	0.08	5.00	8.49
Health & social services	0.34	0.00	46.64	46.99
Arts- entertainment & recreation	0.00	0.34	4.66	4.99
Accommodation & food services	0.35	1.86	13.50	15.72
Other services	15.89	1.70	11.90	29.49
Government & non NAICs	34.84	1.98	4.71	41.53
Total	**241.08**	**75.75**	**293.73**	**610.56**
Change in final demand*	327.51			
Direct impact	241.08			
Indirect impact	75.75			
Induced impact	293.73			
Total output impact	**938.07**			

* For output impact, the change in final demand equals the total District expenditures in Northeast Ohio.

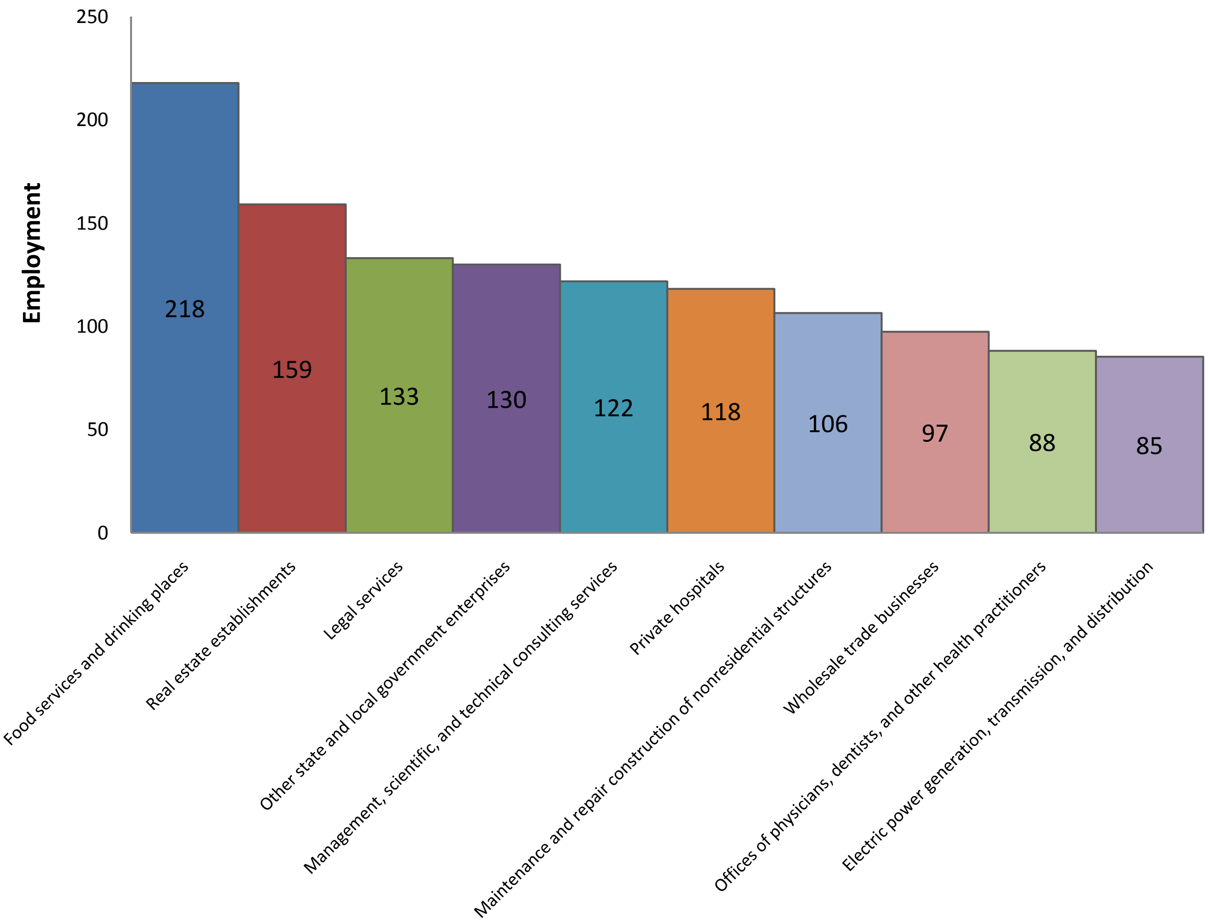
Figure C-6. 4-County Region – Tax Impact of Operating Expenditures, 2012-2016



Total Tax Impact: $82.0 M

APPENDIX D: ECONOMIC IMPACT OF OPERATING EXPENDITURES IN CUYAHOGA COUNTY

Figure D-1. Cuyahoga County – Top 10 Industries with the Highest Total Employment from Operating Expenditures



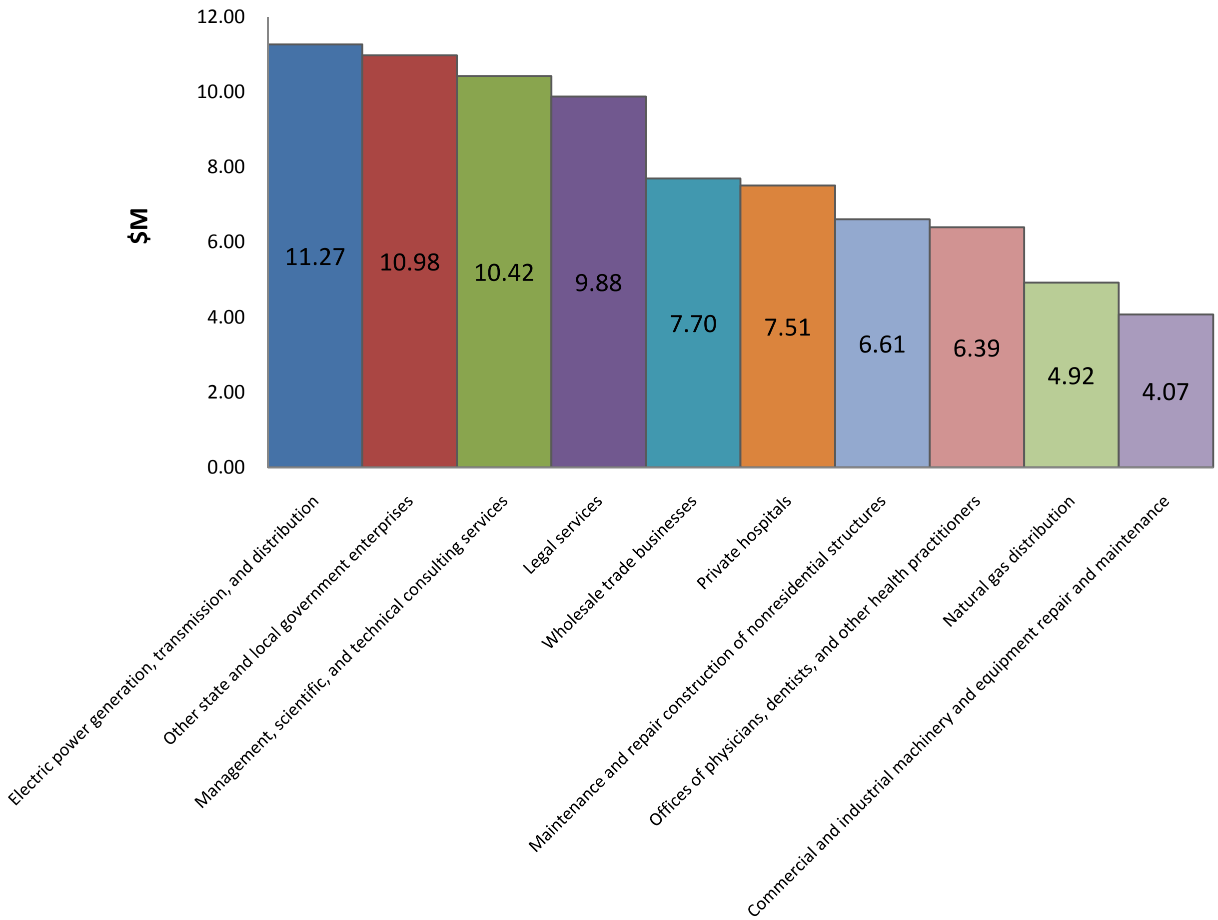
Industry Description	Direct	Indirect	Induced	Total
Food services and drinking places	5	27	187	218
Real estate establishments	0	35	124	159
Legal services	94	11	28	133
Other state and local government enterprises	117	4	9	130
Management, scientific, and technical consulting services	104	9	9	122
Private hospitals	0	0	118	118
Maintenance and repair construction of nonresidential structures	80	21	5	106
Wholesale trade businesses	21	11	65	97
Offices of physicians, dentists, and other health practitioners	0	0	88	88
Electric power generation, transmission, and distribution	82	1	3	85
Total Top 10	503	119	636	1,258
Total Industry	874	383	1,820	3,077
Percentage of 10 Industries	57.55%	31.14%	34.92%	40.88%

Table D-1. Cuyahoga County – Employment Impact from Operating Expenditures by Major Economic Sector

Industry Description	Direct	Indirect	Induced	Total
Agriculture, forestry, fish & hunting	0	0	0	0
Mining	0	7	0	8
Utilities	154	1	4	159
Construction	94	25	12	130
Manufacturing	3	8	16	27
Wholesale Trade	21	11	65	97
Retail trade	21	8	332	361
Transportation & warehousing	3	22	36	61
Information	12	16	29	57
Finance & insurance	0	27	122	149
Real estate & rental	1	38	132	171
Professional- scientific & tech services	233	86	84	404
Management of companies	0	6	9	15
Administrative & waste services	65	73	85	223
Educational services	45	1	81	127
Health & social services	8	0	410	418
Arts- entertainment & recreation	0	5	48	52
Accommodation & food services	6	27	187	220
Other services	85	12	147	244
Government & non NAICs	122	10	20	152
Total	**874**	**383**	**1,820**	**3,077**
Change in final demand*	504			
Direct impact	874			
Indirect impact	383			
Induced impact	1,820			
Total employment impact	**3,581**			

* For employment impact, the change in final demand equals the number of full-time equivalent employees working for the District.

Figure D-2. Cuyahoga County – Top 10 Industries with the Highest Total Labor Income Impact from Operating Expenditures (in Millions of 2010 Dollars)



Industry Description	Direct	Indirect	Induced	Total
Electric power generation, transmission, and distribution	10.85	0.07	0.35	11.27
Other state and local government enterprises	9.86	0.35	0.77	10.98
Management, scientific, and technical consulting services	8.89	0.74	0.80	10.42
Legal services	6.96	0.85	2.07	9.88
Wholesale trade businesses	1.69	0.90	5.11	7.70
Private hospitals	0.00	0.00	7.51	7.51
Maintenance and repair construction of nonresidential structures	4.99	1.32	0.30	6.61
Offices of physicians, dentists, and other health practitioners	0.00	0.00	6.39	6.39
Natural gas distribution	4.82	0.04	0.06	4.92
Commercial & industrial machinery & equipment repair & maintenance	3.82	0.12	0.13	4.07
Total Top 10	51.87	4.40	23.49	79.75
Total Industry	65.22	21.04	76.39	162.65
Percentage of 10 Industries	79.53%	20.89%	30.74%	49.03%

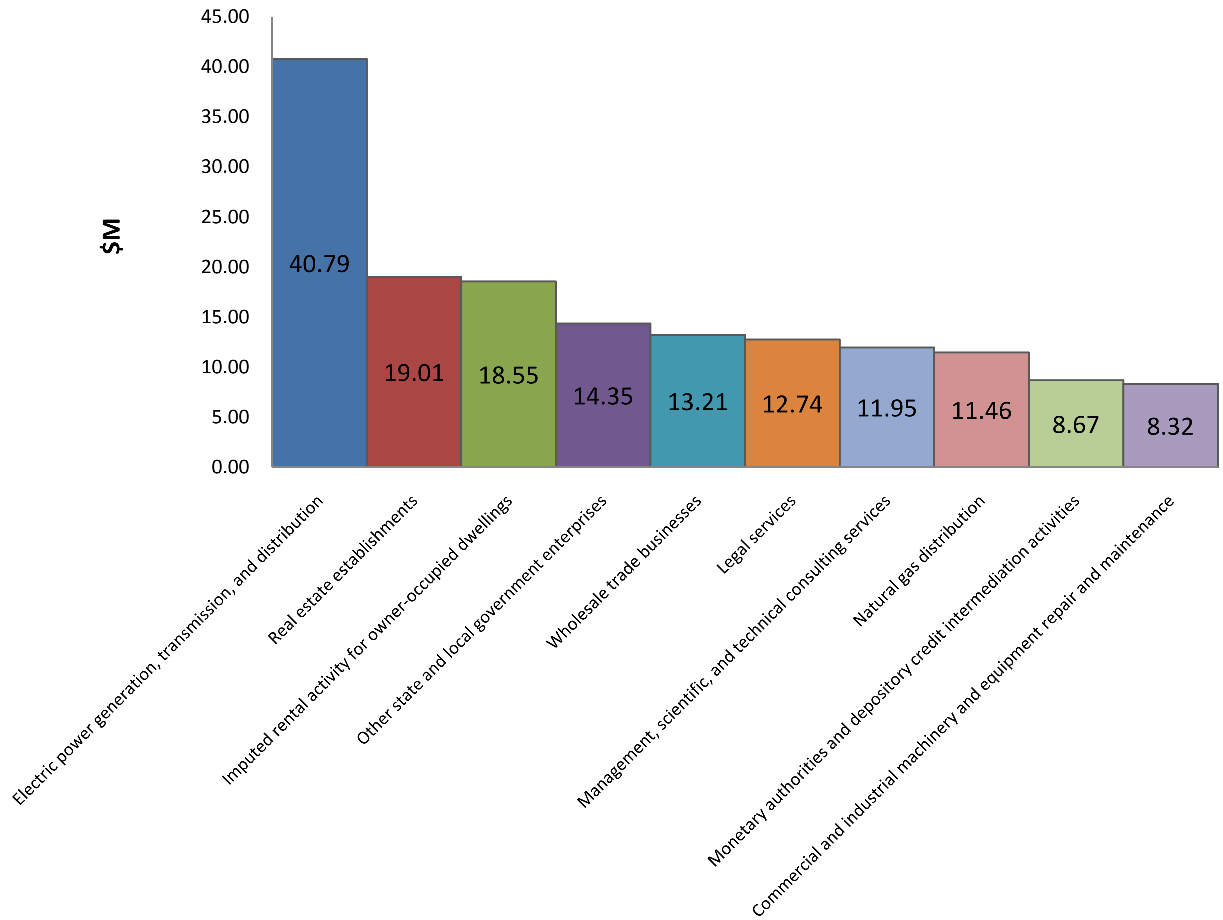
* These numbers represent only the top10 industries in terms of direct, indirect, and induced impacts

Table D-2. Cuyahoga County – Labor Income Impact from Operating Expenditures by Major Economic Sector (in Millions of 2010 Dollars)

Industry Description	Direct	Indirect	Induced	Total
Agriculture, forestry, fish & hunting	0.00	0.00	0.01	0.01
Mining	0.00	0.69	0.03	0.72
Utilities	18.77	0.16	0.49	19.42
Construction	5.73	1.46	0.59	7.78
Manufacturing	0.18	0.69	1.06	1.92
Wholesale Trade	1.69	0.90	5.11	7.70
Retail trade	0.73	0.24	9.65	10.63
Transportation & warehousing	0.23	1.15	1.76	3.13
Information	1.01	1.11	2.00	4.13
Finance & insurance	0.00	2.18	9.53	11.71
Real estate & rental	0.04	1.08	3.50	4.62
Professional- scientific & tech services	17.58	6.07	5.74	29.39
Management of companies	0.00	0.61	0.98	1.60
Administrative & waste services	2.81	2.70	2.86	8.37
Educational services	1.17	0.03	2.26	3.46
Health & social services	0.13	0.00	19.99	20.12
Arts- entertainment & recreation	0.00	0.13	1.39	1.52
Accommodation & food services	0.12	0.50	3.49	4.10
Other services	4.71	0.56	4.31	9.57
Government & non NAICs	10.33	0.78	1.63	12.74
Total	**65.22**	**21.04**	**76.39**	**162.65**
Change in final demand*	196.16			
Direct impact	65.22			
Indirect impact	21.04			
Induced impact	76.39			
Total labor income impact	**358.81**			

* For labor income impact, the change in final demand equals the payroll of employees working for the District.

Figure D-3. Cuyahoga County – Top 10 Industries with the Highest Total Value Added Impact from Operating Expenditures (in Millions of 2010 Dollars)



Industry Description	Direct	Indirect	Induced	Total
Electric power generation, transmission, and distribution	39.28	0.26	1.25	40.79
Real estate establishments	0.00	4.19	14.82	19.01
Imputed rental activity for owner-occupied dwellings	0.00	0.00	18.55	18.55
Other state and local government enterprises	12.89	0.46	1.01	14.35
Wholesale trade businesses	2.90	1.55	8.76	13.21
Legal services	8.97	1.09	2.67	12.74
Management, scientific, and technical consulting services	10.19	0.85	0.91	11.95
Natural gas distribution	11.22	0.10	0.14	11.46
Monetary authorities and depository credit intermediation activities	0.00	2.78	5.88	8.67
Commercial & industrial machinery & equipment repair & maintenance	7.80	0.25	0.27	8.32
Total Top 10	93.25	11.53	54.26	159.04
Total Industry	118.28	34.45	137.92	290.65
Percentage of 10 Industries	78.84%	33.47%	39.34%	54.72%

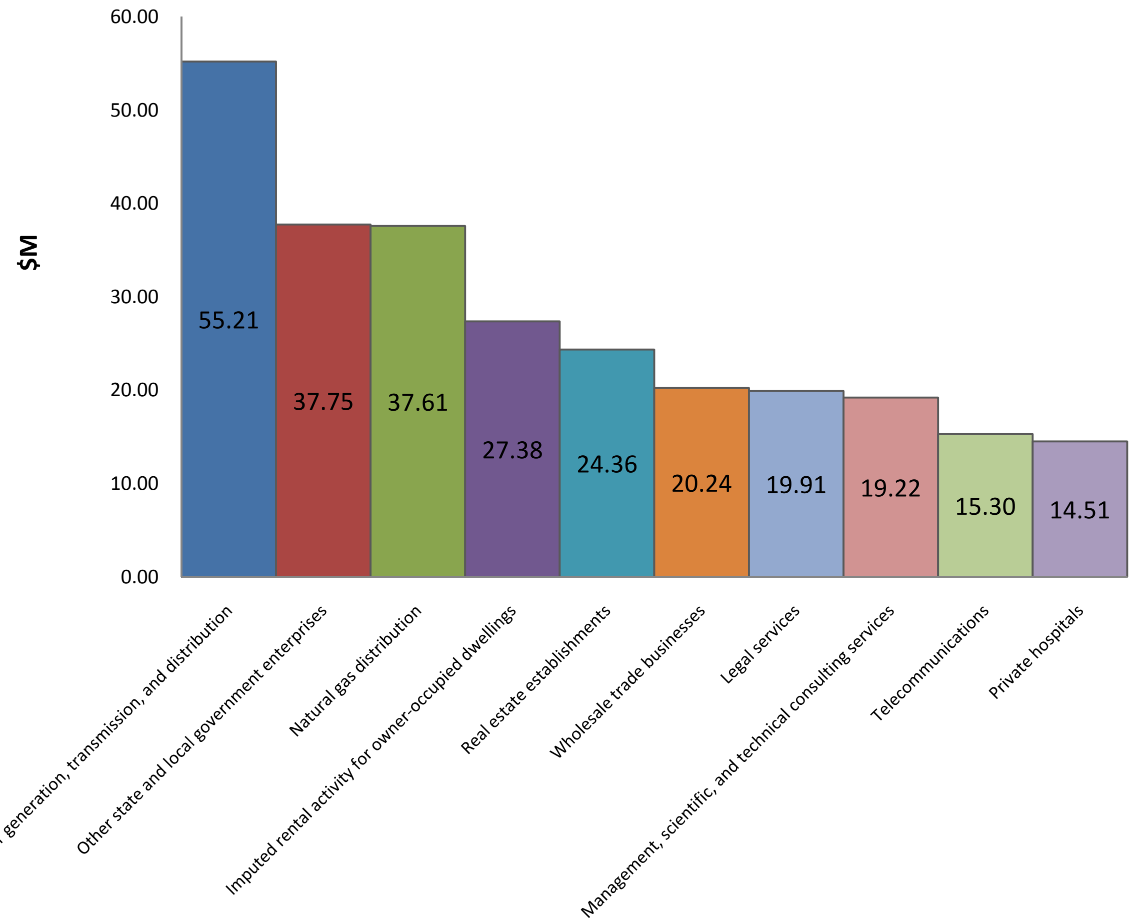
* These numbers represent only the top ten industries in terms of direct, indirect, and induced impacts

Table D-3. Cuyahoga County – Value Added Impact from Operating Expenditures by Major Economic Sector (in Millions of 2010 Dollars)

Industry Description	Direct	Indirect	Induced	Total
Agriculture, forestry, fish & hunting	0.00	0.00	0.01	0.01
Mining	0.00	1.86	0.07	1.93
Utilities	55.80	0.43	1.54	57.78
Construction	6.01	1.57	0.76	8.34
Manufacturing	0.25	1.04	1.69	2.99
Wholesale trade	2.90	1.55	8.76	13.21
Retail trade	1.20	0.40	16.11	17.70
Transportation & warehousing	0.30	1.73	2.46	4.49
Information	2.70	2.46	4.37	9.54
Finance & insurance	0.00	4.34	16.15	20.48
Real estate & rental	0.07	4.76	34.11	38.94
Professional- scientific & tech services	21.24	7.31	7.07	35.61
Management of companies	0.00	0.82	1.32	2.14
Administrative & waste services	4.19	3.57	3.64	11.40
Educational services	1.41	0.04	2.48	3.93
Health & social services	0.22	0.00	23.19	23.41
Arts- entertainment & recreation	0.00	0.17	2.00	2.17
Accommodation & food services	0.18	0.75	5.23	6.16
Other services	8.47	0.80	5.14	14.41
Government & non NAICs	13.33	0.85	1.82	16.01
Total	**118.28**	**34.45**	**137.92**	**290.65**
Change in final demand*	196.16			
Direct impact	118.28			
Indirect impact	34.45			
Induced impact	137.92			
Total value added impact	**486.81**			

* For value added, the change in final demand equals the total District expenditures in Northeast Ohio.

Figure D-4. Cuyahoga County – Top 10 Industries with the Highest Total Output Impact from Operating Expenditures (in Millions of 2010 Dollars)



Industry Description	Direct	Indirect	Induced	Total
Electric power generation, transmission, and distribution	53.17	0.35	1.69	55.21
Other state and local government enterprises	33.91	1.20	2.65	37.75
Natural gas distribution	36.82	0.33	0.46	37.61
Imputed rental activity for owner-occupied dwellings	0.00	0.00	27.38	27.38
Real estate establishments	0.00	5.38	18.99	24.36
Wholesale trade businesses	4.44	2.37	13.43	20.24
Legal services	14.03	1.71	4.18	19.91
Management, scientific, and technical consulting services	16.38	1.36	1.47	19.22
Telecommunications	6.15	3.12	6.03	15.30
Private hospitals	0.00	0.00	14.51	14.51
Total Top 10	164.90	15.82	90.79	271.51
Total Industry	216.86	59.30	228.80	504.97
Percentage of 10 Industries	76.04%	26.68%	39.68%	53.77%

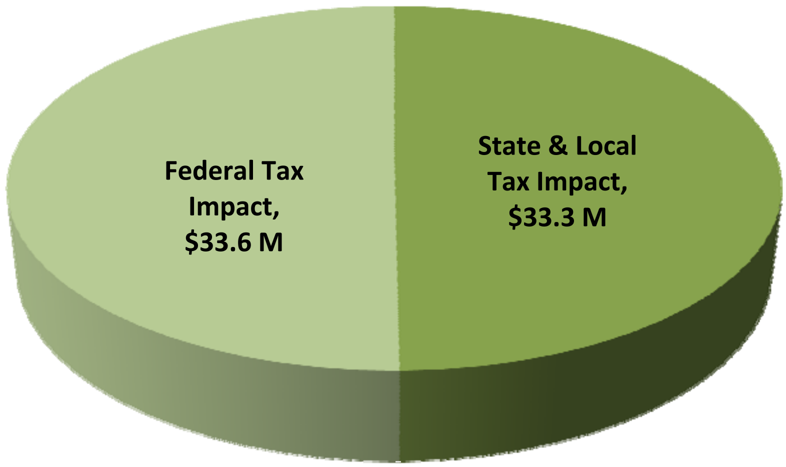
* These numbers represent only the top 10 industries in terms of direct, indirect, and induced impacts

Table D-4. Cuyahoga County – Output Impact from Operating Expenditures by Major Economic Sector (in Millions of 2010 Dollars)

Industry Description	Direct	Indirect	Induced	Total
Agriculture, forestry, fish & hunting	0.00	0.00	0.02	0.02
Mining	0.00	3.17	0.12	3.28
Utilities	97.36	0.78	2.36	100.50
Construction	11.44	2.91	1.27	15.62
Manufacturing	0.55	3.03	6.54	10.12
Wholesale trade	4.44	2.37	13.43	20.24
Retail trade	1.80	0.58	23.77	26.14
Transportation & warehousing	0.69	3.20	4.49	8.38
Information	6.22	6.05	10.67	22.95
Finance & insurance	0.00	7.01	30.65	37.66
Real estate & rental	0.18	6.51	47.82	54.51
Professional- scientific & tech services	34.47	11.96	11.44	57.87
Management of companies	0.00	1.32	2.12	3.44
Administrative & waste services	8.57	5.53	5.59	19.69
Educational services	2.79	0.07	4.43	7.29
Health & social services	0.34	0.00	37.25	37.60
Arts- entertainment & recreation	0.00	0.28	4.01	4.30
Accommodation & food services	0.34	1.46	10.20	12.00
Other services	13.21	1.36	8.92	23.49
Government & non NAICs	34.46	1.71	3.71	39.88
Total	**216.86**	**59.30**	**228.80**	**504.97**
Change in final demand*	327.51			
Direct impact	216.86			
Indirect impact	59.30			
Induced impact	228.80			
Total output impact	**832.47**			

* For output, the change in final demand equals the total District expenditures in Northeast Ohio.

Figure D-5. Cuyahoga County – Tax Impact of Operating Expenditures, 2012-2016



Total Tax Impact: $66.9 M

APPENDIX E: PRESENTATION TO THE DISTRICT BOARD OF TRUSTEES– THE NORTHEAST OHIO REGIONAL SEWER DISTRICT: ECONOMIC IMPACT OF CAPITAL AND OPERATING EXPENDITURES

AUGUST 5, 2010

The Northeast Ohio Regional Sewer District: Economic Impact of Capital and Operating Expenditures

Cleveland State University
Maxine Goodman Levin College of Urban Affairs

Center for Economic Development

August 5, 2010

Introduction

Overview

- Measure economic impact of the District’s operating expenses and Capital Improvement Program (CIP), 2012-2016
  - The Sewer District is responsible for an important part of Northeast Ohio’s infrastructure
  - Updating regional infrastructure is critical to economic growth
    - Particularly true in old regions where large investments in infrastructure are required

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Introduction

What is Economic Impact

- An analytical approach used to estimate economic benefits from projects or programs for a specific region and specific time period
- Economic Impact = direct impact + indirect impact + induced impact
  - Direct impact: expenditures made by the District as a result of its operation and construction
  - Indirect impact: local jobs and production used to produce goods and services required by the District (second-round and additional-round effects)
  - Induced impact: change in spending of local households due to their increased earnings

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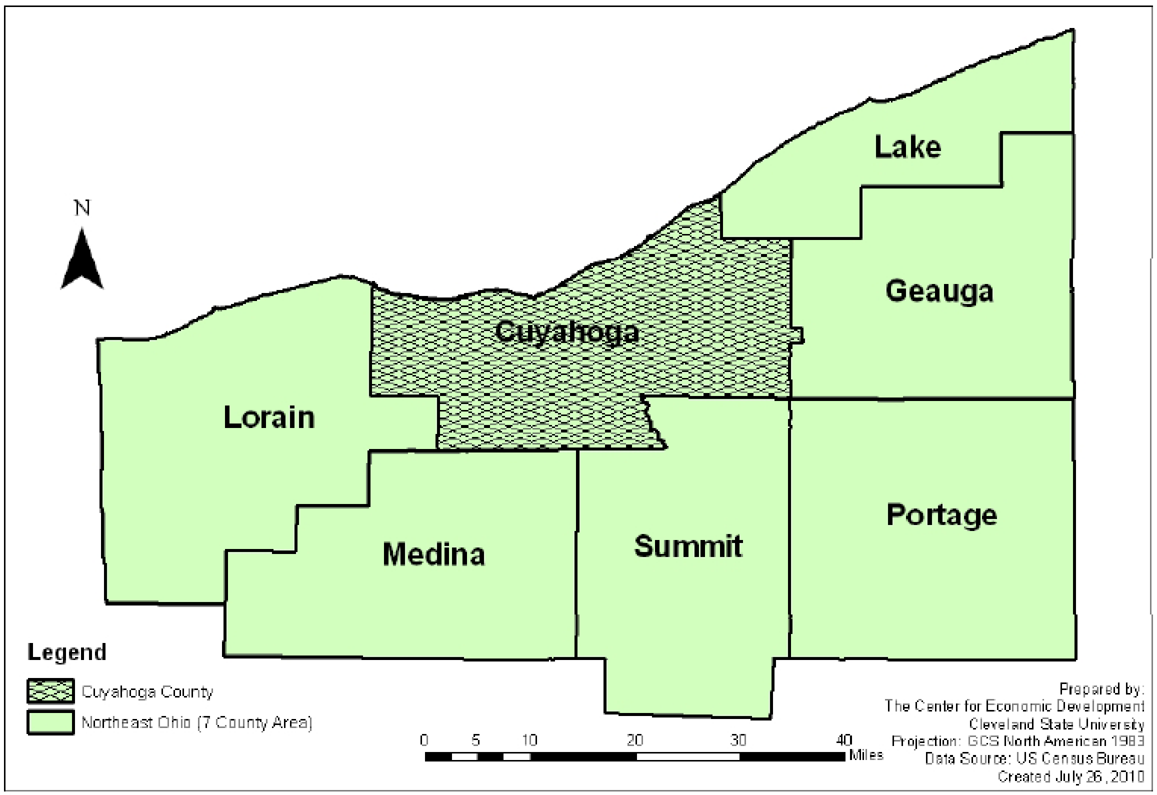
Introduction

Economic Impact Regions



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Introduction

How Analysis is Conducted

- Impact analysis is based on information provided by the District for the 2012-2016 capital and operating expenditures:
  - Planning-level cost estimates of planned capital projects
  - Projected operating expenditures based on past expenditures
  - Estimated % of labor & materials spent in the identified regions

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Introduction

How Analysis is Conducted

- District data are used as input into an economic impact model: IMPLAN
  - IMPLAN is an economic impact assessment software system
  - IMPLAN accounts for inter-industry relationships which determine how regional economies respond to changes in projects and programs
  - IMPLAN estimates regional multipliers capturing the "ripple effect" throughout the economy

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District Expenditures

District Expenditures

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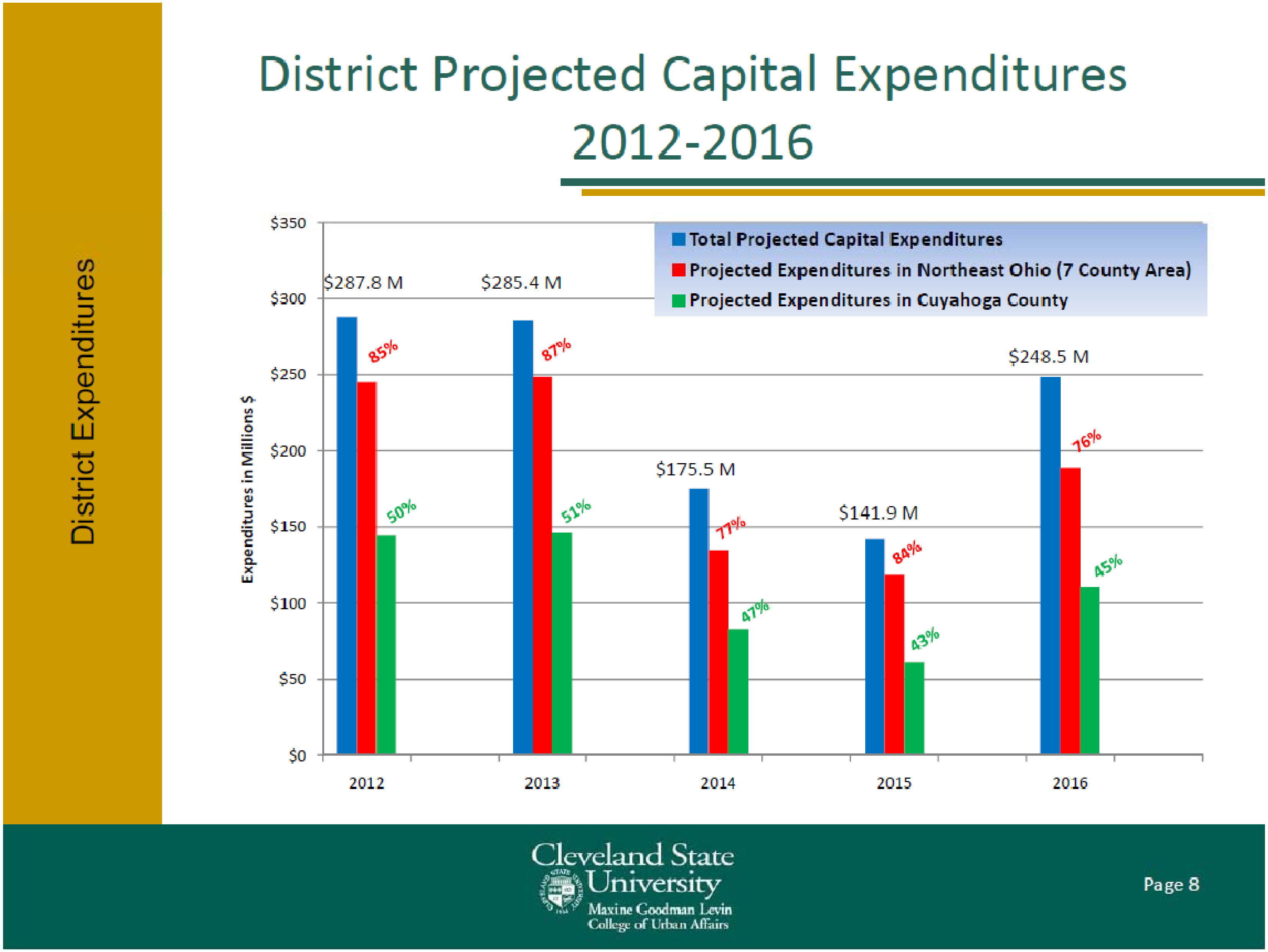
District Expenditures
District Projected Capital Expenditures 2012-2016
Total Projected Capital Expenditures
Projected Expenditures in Northeast Ohio (7 County Area)
Projected Expenditures in Cuyahoga County
Expenditures in Millions $
$350
$300
$250
$200
$150
$100
$50
$0
$287.8 M
85%
50%
$285.4 M
87%
51%
$175.5 M
77%
47%
$141.9 M
84%
43%
$248.5 M
76%
45%
2012
2013
2014
2015
2016
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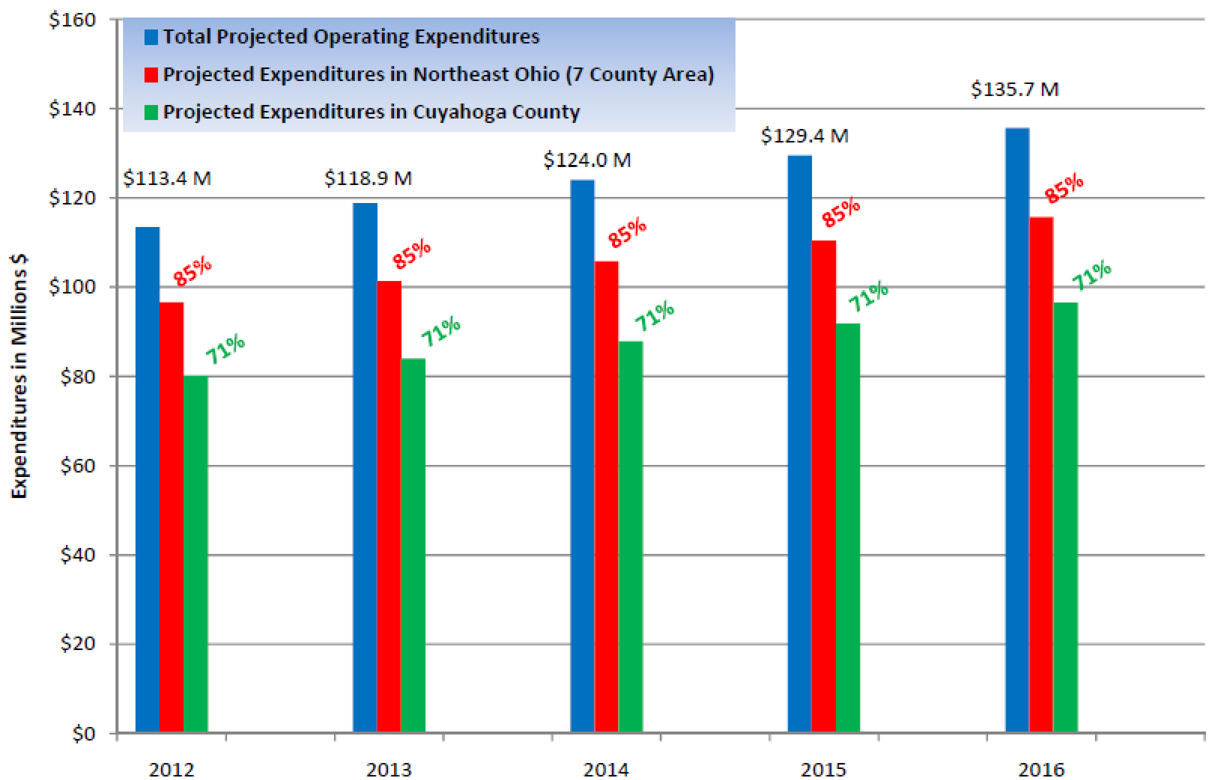
District Expenditures

District Projected Operating Expenditures 2012-2016



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Economic Impact

Economic Impact of Capital Expenditures

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Economic Impact

Measurement of Economic Impact

- **Employment impact**: number of additional jobs created in the region
- **Labor Income impact:** additional household earnings (Employee Compensation + Proprietors Income)
- **Value Added impact**: additional value added output produced in the region (total sales less intermediary goods which are not sold as final products)
- **Output impact**: additional total value of goods and services produced in the economy
- **Tax impact**: additional federal, state, and local tax revenues

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Economic Impact of Capital Expenditures

Northeast Ohio (7 County Area) – Economic Impact of Capital Expenditures, 2012-2016

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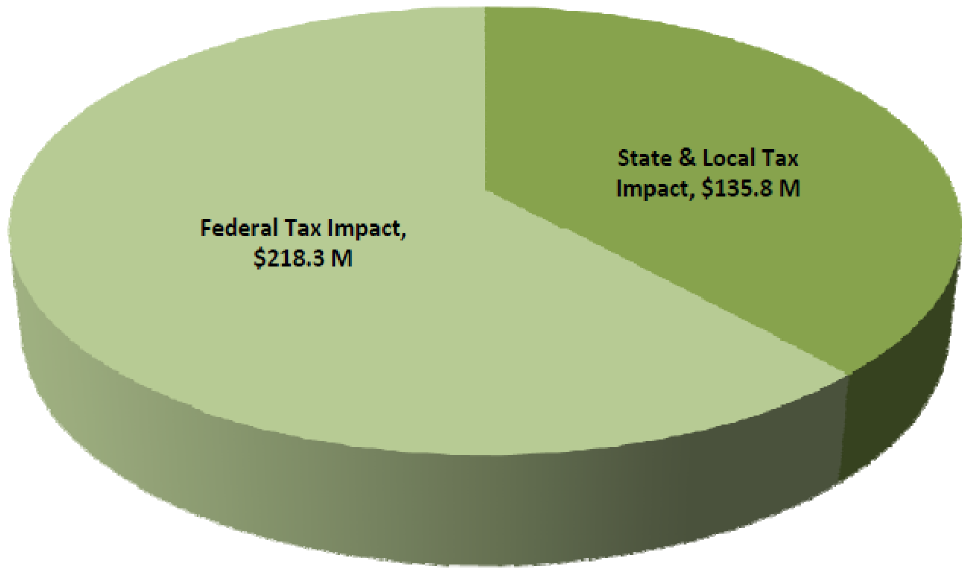
Economic Impact of Capital Expenditures

Northeast Ohio – Tax Impact of Capital Expenditures, 2012-2016



Total Tax Impact: $354.0 M

(Impact in 2010 dollars)

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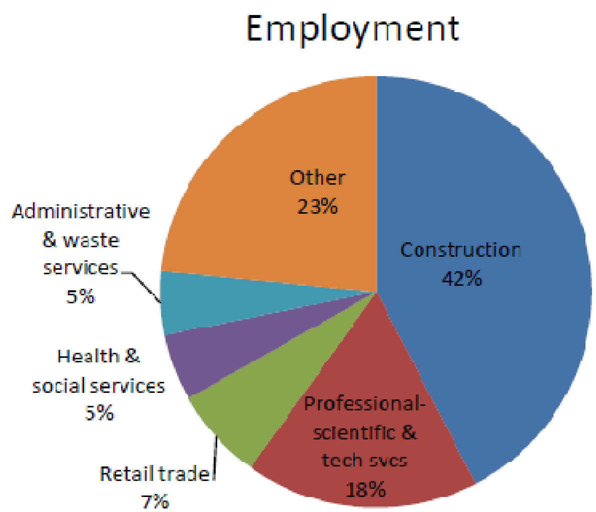
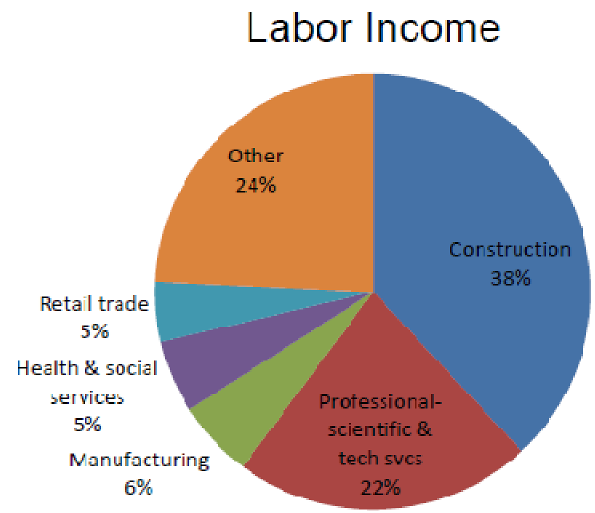
Economic Impact of Capital Expenditures

Northeast Ohio – Total Impacts by Major Economic Sectors



Total Employment Impact: 26,591



Total Labor Income Impact: $1,159.9 M

(Impact in 2010 dollars)

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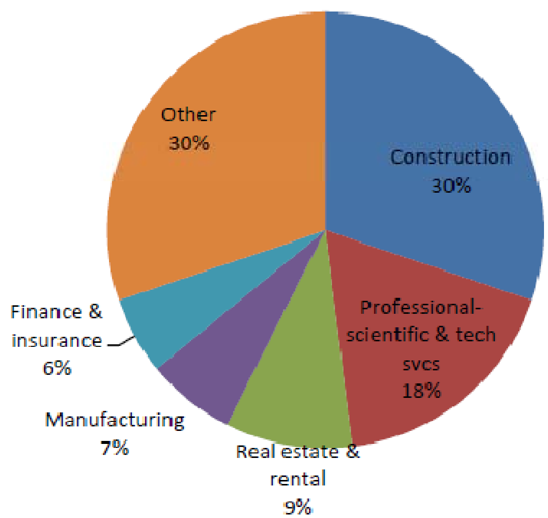
Economic Impact of Capital Expenditures

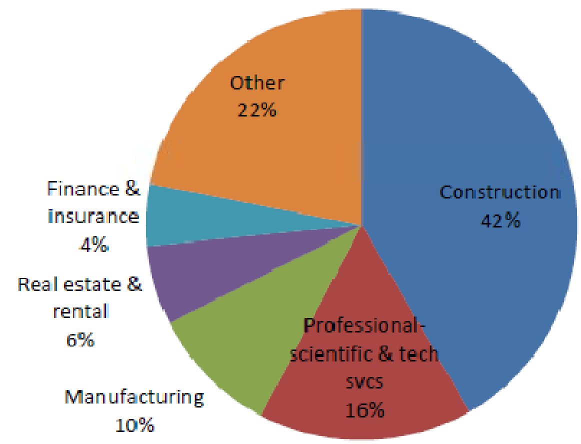
Northeast Ohio – Total Impacts by Major Economic Sectors

Value Added



Total Value Added Impact: $1,569.0 M

Output



Total Output Impact: $3,656.7 M

(Impact in 2010 dollars)

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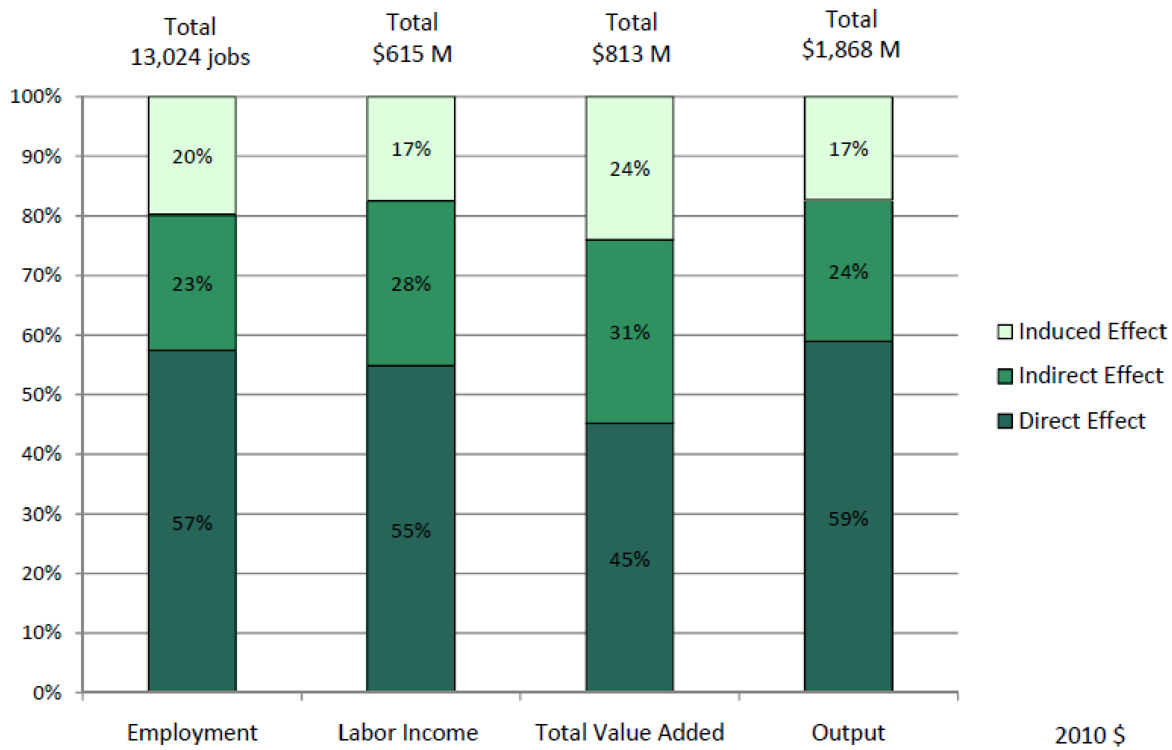
Economic Impact of Capital Expenditures

Cuyahoga County – Economic Impact of Capital Expenditures, 2012-2016



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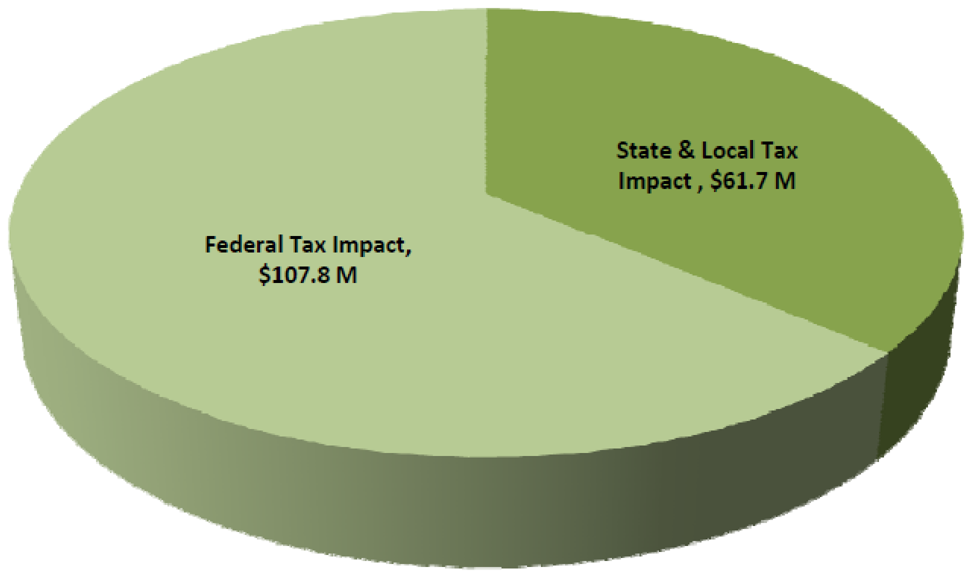
Economic Impact of Capital Expenditures

Cuyahoga County – Tax Impact of Capital Expenditures, 2012-2016



Total Tax Impact: $169.5 M

(Impact in 2010 dollars)

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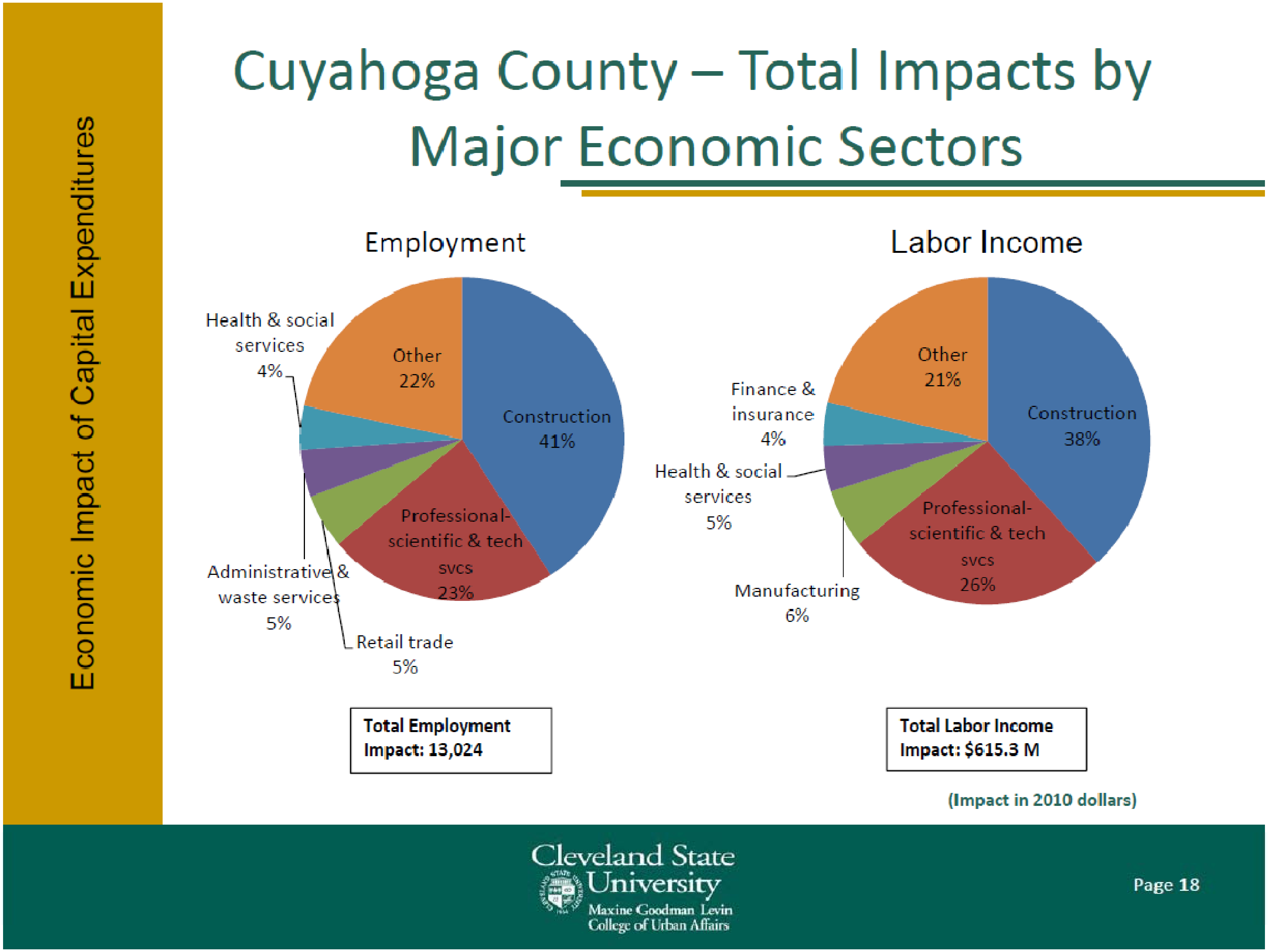
Economic Impact of Capital Expenditures
Cuyahoga County – Total Impacts by Major Economic Sectors
Employment
Construction 41%
Professional-scientific & tech svcs 23%
Retail trade 5%
Administrative & waste services 5%
Health & social services 4%
Other 22%
Total Employment Impact: 13,024
Labor Income
Construction 38%
Professional-scientific & tech svcs 26%
Manufacturing 6%
Health & social services 5%
Finance & insurance 4%
Other 21%
Total Labor Income Impact: $615.3 M
(Impact in 2010 dollars)
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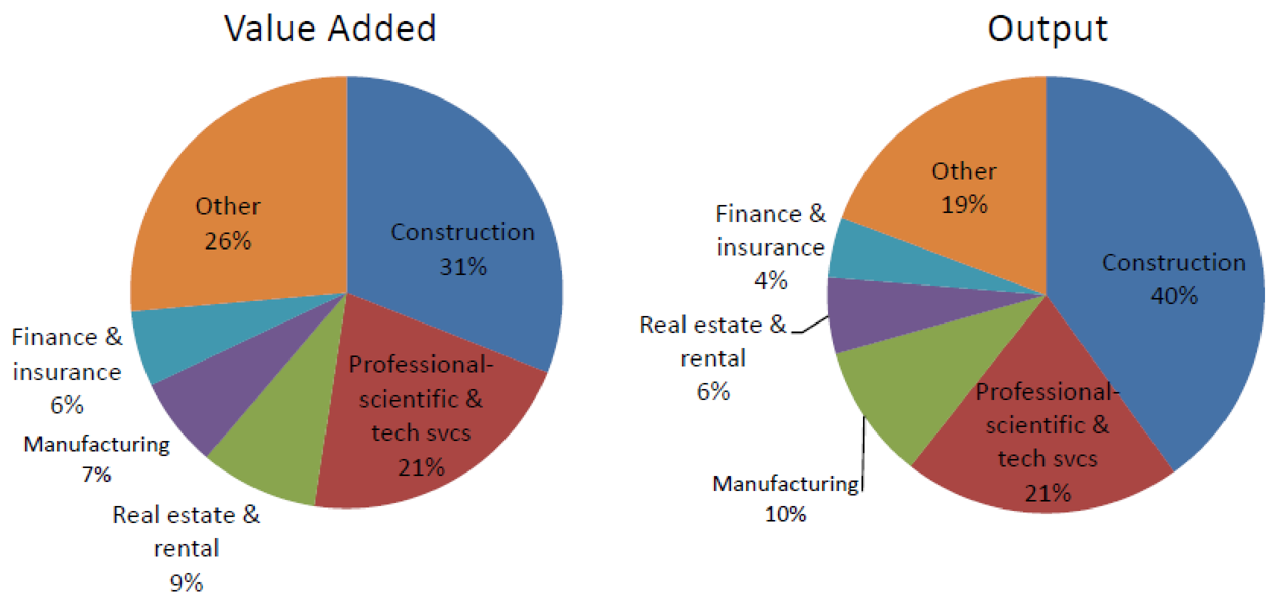
Economic Impact of Capital Expenditures

Cuyahoga County – Total Impacts by Major Economic Sectors



Total Value Added Impact: $812.7 M

Total Output Impact: $1,867.5 M

(Impact in 2010 dollars)

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Economic Impact of Operating Expenditures

Economic Impact of Operating Expenditures

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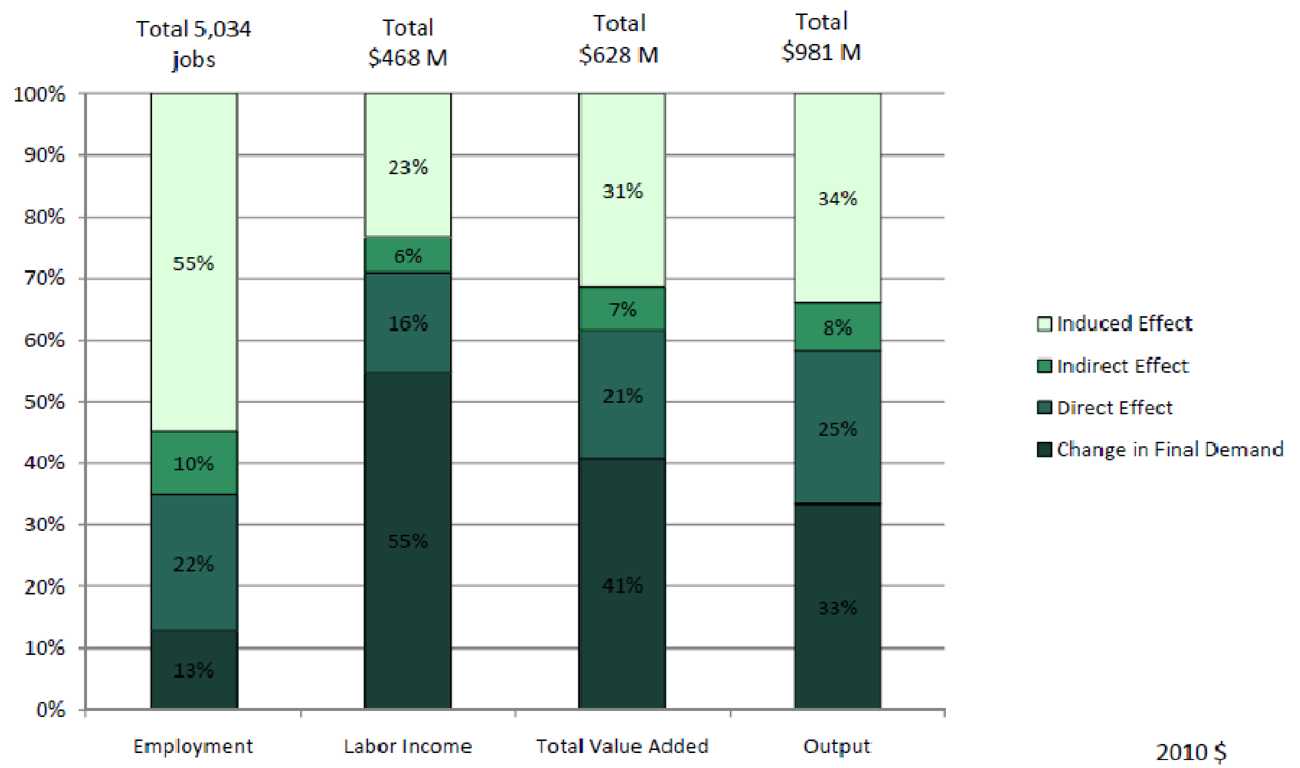
Economic Impact of Operating Expenditures

Northeast Ohio (7 County Area) – Economic Impact of Operating Expenditures, 2012-2016



2010 $

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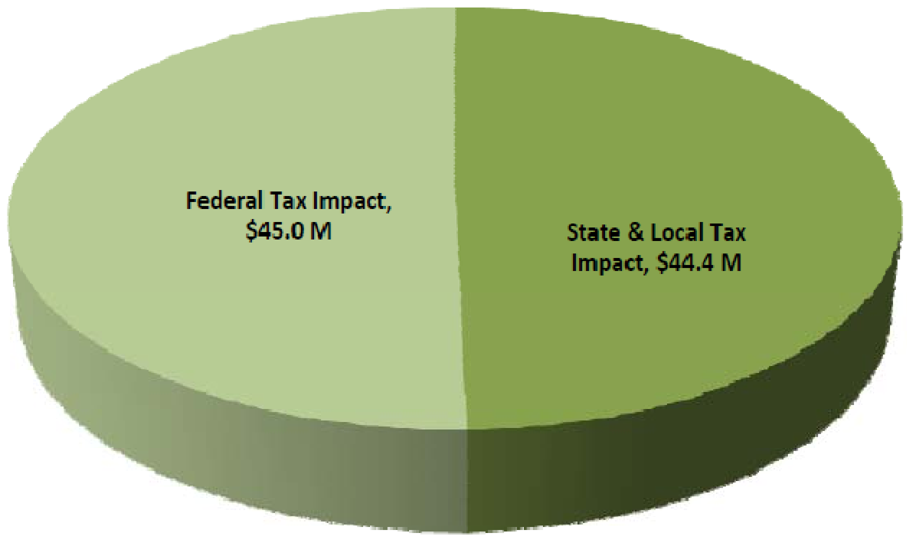
Economic Impact of Operating Expenditures

Northeast Ohio – Tax Impact of Operating Expenditures, 2012-2016



Total Tax Impact: $89.4 M

(Impact in 2010 dollars)

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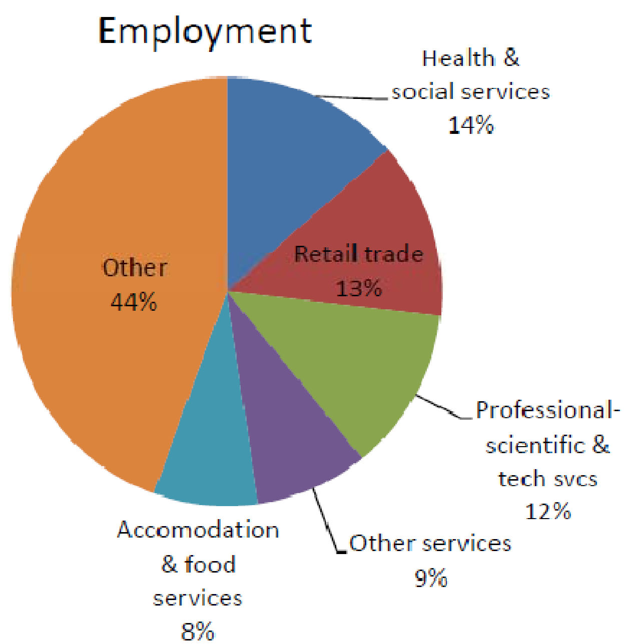
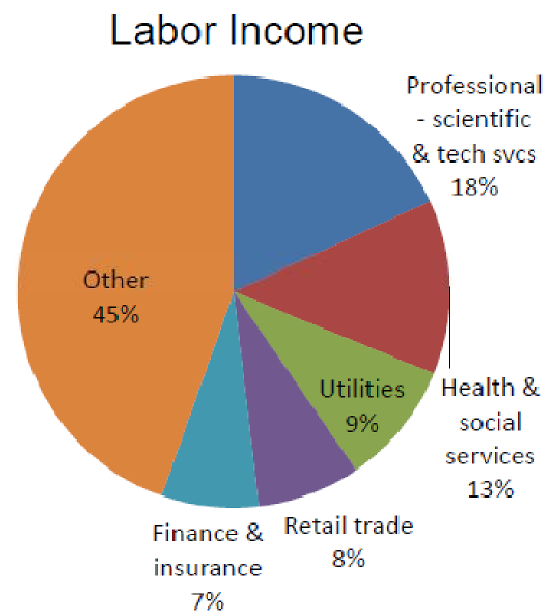
Economic Impact of Operating Expenditures

Northeast Ohio – Total Impacts by Major Economic Sectors



Total Employment Impact: 5,034



Total Labor Income Impact: $467.7 M

(Impact in 2010 dollars)

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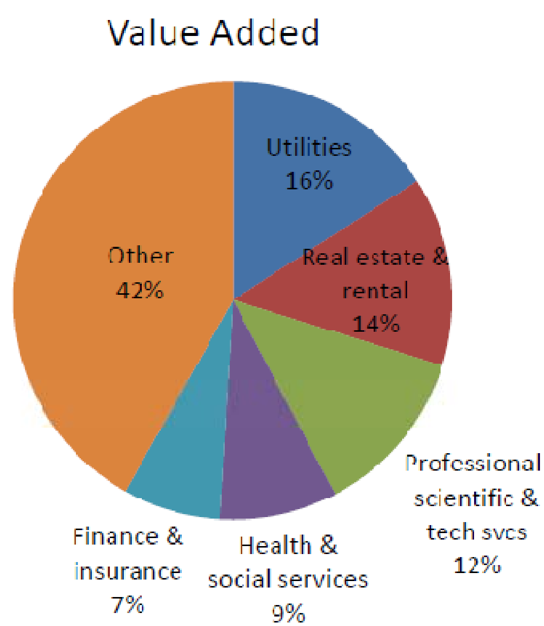
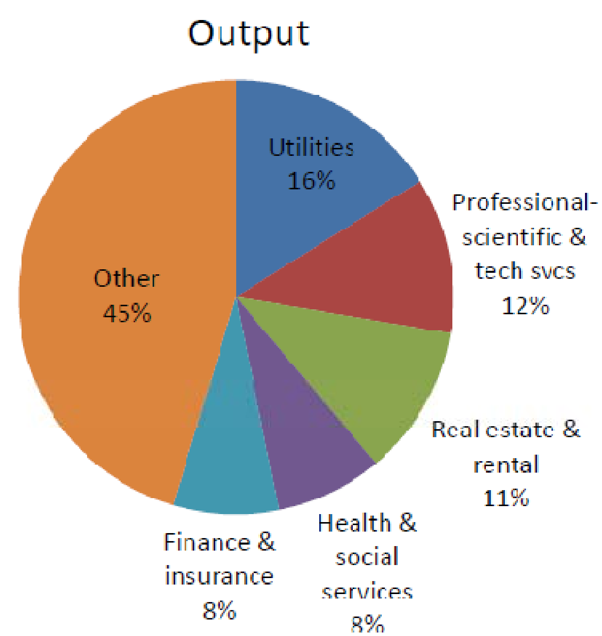
Economic Impact of Operating Expenditures

Northeast Ohio – Total Impacts by Major Economic Sectors



Total Value Added Impact: $628.0 M



Total Output Impact: $980.9 M

(Impact in 2010 dollars)

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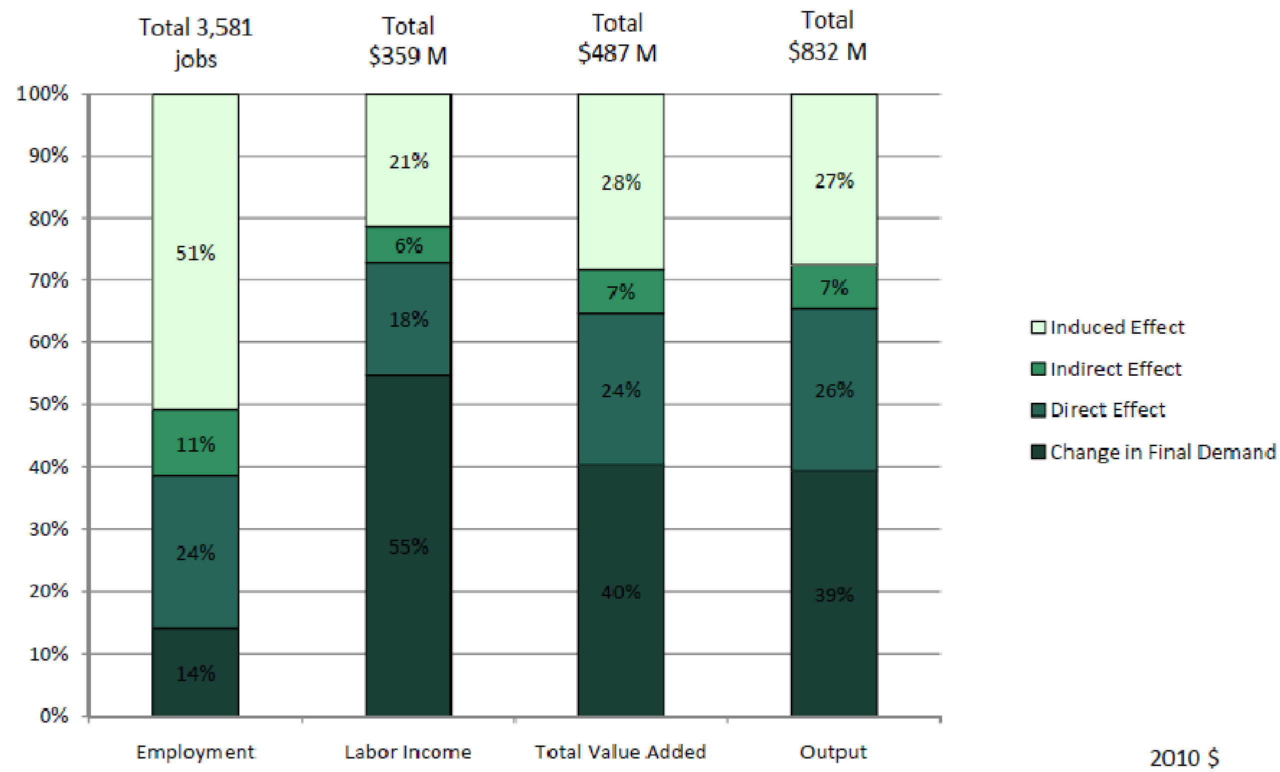
Economic Impact of Operating Expenditures

Cuyahoga County – Economic Impact of Operating Expenditures, 2012-2016



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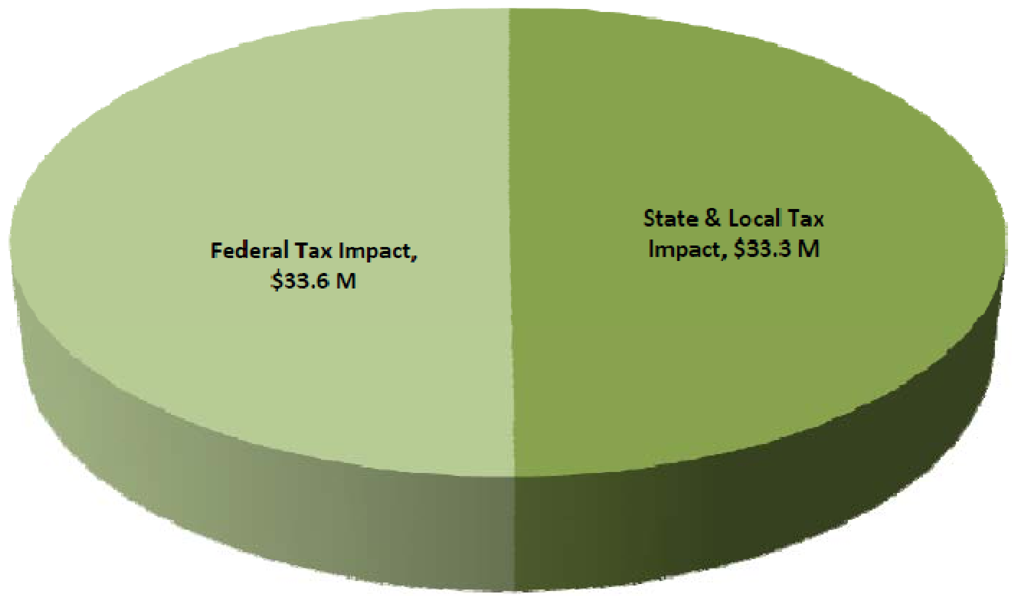
Economic Impact of Operating Expenditures

Cuyahoga County – Tax Impact of Operating Expenditures, 2012-2016



Total Tax Impact: $66.9 M

(Impact in 2010 dollars)

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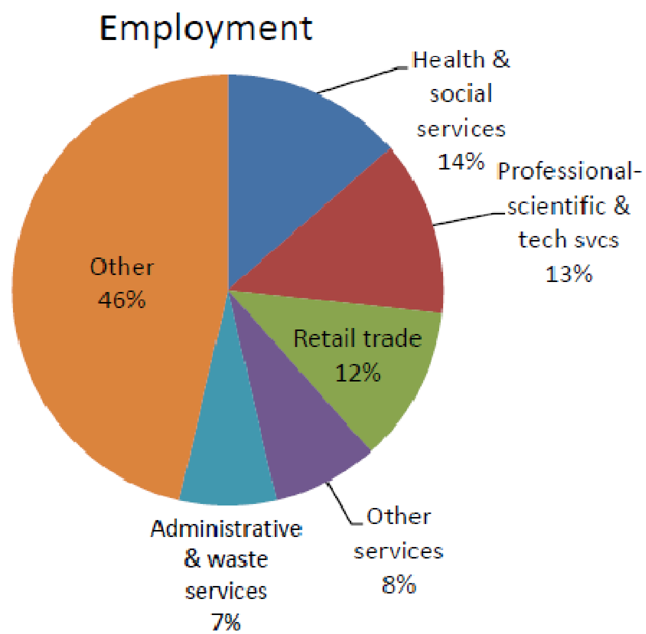
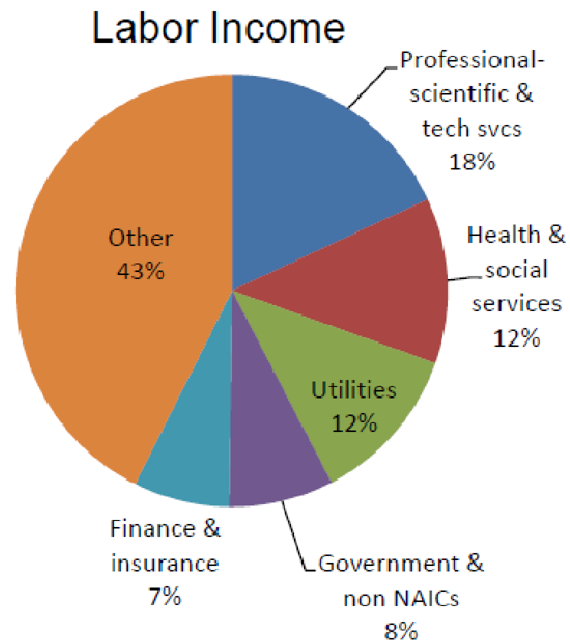
Economic Impact of Operating Expenditures

Cuyahoga County – Total Impacts by Major Economic Sectors



Total Employment Impact: 3,581



Total Labor Income Impact: $358.8 M

(Impact in 2010 dollars)

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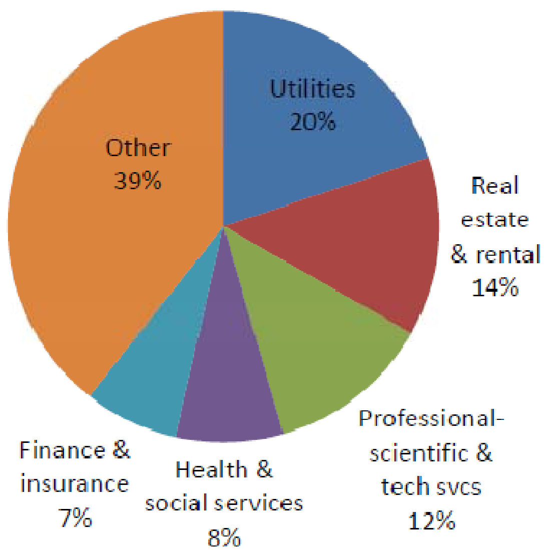
Economic Impact of Operating Expenditures

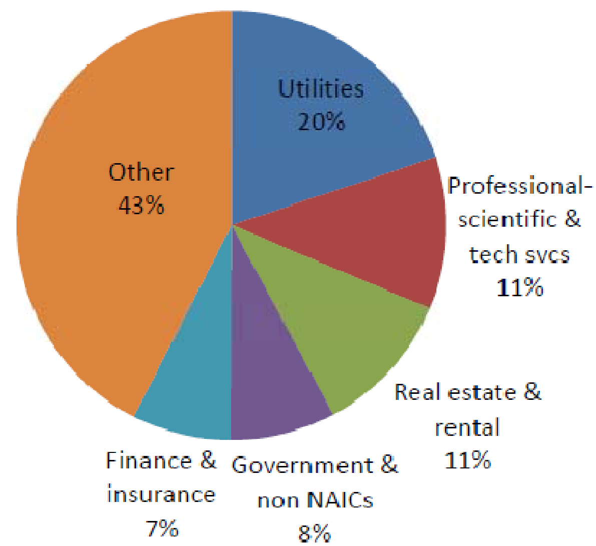
Cuyahoga County – Total Impacts by Major Economic Sectors

Value Added



Total Value Added Impact: $486.8 M

Output



Total Output Impact: $832.5 M

(Impact in 2010 dollars)

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Summary

Total District Economic Impact

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Summary

2012-2016 District Expenditures

- Large portion of expenditures are estimated to remain in Northeast Ohio
  - 83% in 7-County Area
  - 56% in Cuyahoga County

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Summary

Impacts of Projected 2012-2016 District Expenditures

	Employment	Labor Income	Value Added	Output	Tax
	# of jobs	In Millions of Dollars			
Northeast Ohio (7 -County Area)					
Capital: Total	26,591	1,159.9	1,569.0	3,656.7	354.0
Operating: Total	5,034	467.7	628.0	980.9	89.4
Total Impact	**31,625**	**1,627.6**	**2,196.9**	**4,637.6**	**443.5**
Cuyahoga County					
Capital: Total	13,024	615.3	812.7	1,867.5	169.5
Operating: Total	3,581	358.8	486.8	832.5	66.9
Total Impact	**16,605**	**974.1**	**1,299.5**	**2,700.0**	**236.4**

Impacts are measured in 2010 dollars.
Regions cannot be added: Cuyahoga County is included in Northeast Ohio .

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Summary

Five-Year Impacts in Northeast Ohio (7 County Area)

- Employment: 1 job for every $55,674 spent
- Labor Income: $0.92 for every $1 spent
- Value added: $1.25 for every $1 spent
- Output: $2.63 for every $1 spent
- Taxes: $0.25 for every $1 spent

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Summary

Five-Year Impacts in Cuyahoga County

- Employment: 1 job for every $106,034 spent
- Labor Income: $0.55 for every $1 spent
- Value added: $0.74 for every $1 spent
- Output: $1.53 for every $1 spent
- Taxes: $0.13 for every $1 spent

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APPENDIX F: SOURCE DATA FROM THE DISTRICT